AXIOMTEK

MANO882 Series

Intel® Socket 1150 Xeon® E3/ Core™ i7/ i5/ i3/ Celeron® Processor Mini ITX Board with HDMI/ VGA/ LVDS/ DisplayPort

User's Manual

RoHS

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CAUTION

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

Trademarks Acknowledgments

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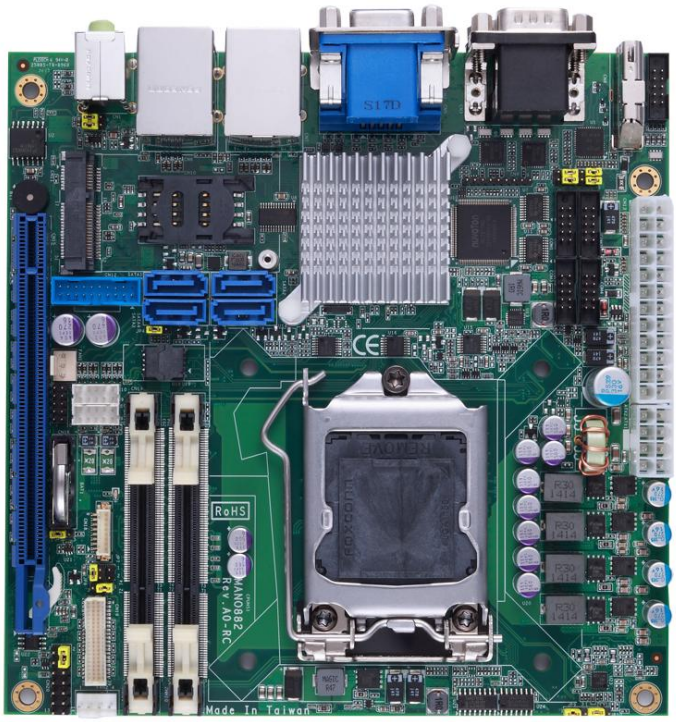
Chapter 1
Introduction



The MANO882 with C226 is a Mini ITX board based on Intel® Xeon® E3/ Core™ i7/ i5/ i3 and Celeron® desktop processors in LGA1150 socket; supporting 22nm technology. The board integrates Intel® C226 chipset that delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions. There are two 204-pin DDR3 SO-DIMM sockets for dual channel DDR3 1600/1333MHz memory with maximum capacity up to 16GB; assuming dual channel mode of two 8GB double-sided unbuffered, non-ECC SO-DIMM memory configuration. The board also features Gigabit Ethernet, four SATA 3.0 ports (support SATA RAID 0/1/5/10 by C226) at maximum transfer rate up to 6Gb/s, four USB 3.0 and six USB 2.0 high speed compliant ports that can achieve the best stability and reliability for industrial applications.

1.1 Features

- LGA1150 socket 4th Generation Intel® Xeon® E3/ Core™ i7 /i5 /i3 /Celeron® processors
- 2 DDR3 1600/1333MHz up to 16GB
- PCI-Express Gen. 3 supported
- 4 SATA-600 with RAID 0, 1, 5 and 10 supported
- 4 USB 3.0 supported
- iAMT 9.0 supported
- TPM 1.2 supported
- Triple view display

1.2 Specifications

- **CPU**
  - Intel® Xeon® E3/ Core™ i7/ i5/ i3/ Celeron® desktop processors.
- **System Chipset**
  - Intel® C226.
- **CPU Socket**
  - LGA1150 socket.
- **BIOS**
  - AMI BIOS via SPI interface with socket.
- **System Memory**
  - Two 204-pin unbuffered DDR3 SO-DIMM sockets.
  - Maximum up to 16GB DDR3 1600/1333MHz memory with two SO-DIMMs using 8GB memory technology.
- **Onboard Multi I/O**
  - Controller: Nuvoton NCT6106D.
  - Serial ports: Four RS-232 ports (COM3/4/5/6) and two RS-232/422/485 ports (COM1/2).
- **Serial ATA**
  - Four SATA 3.0 ports (6Gb/s performance) with SATA RAID 0/1/5/10.
- **USB Interface**
  - Four USB 3.0 ports with fuse protection.
  - Six USB 2.0 ports with fuse protection.
- **Display**
  - One HDMI.
  - One LVDS 18/24-bit single/dual channel.
  - One VGA.
  - One DisplayPort.
- **Watchdog Timer**
  - 1~255 seconds; up to 255 levels.
- **Expansion Interface**
  - One PCI-Express x16 slot.
- **Ethernet**
  - LAN1 – Intel® I217LM supports 1000/100/10Mbps.
  - LAN2 – Intel® i210AT supports 1000/100/10Mbps.
- **Audio**
  - HD audio compliant (with line/speaker-out and MIC-in) via ALC662.
  - Speaker-out with 1W/8Ω x2.

- **Power Management**
  - ACPI (Advanced Configuration and Power Interface).

- **Form Factor**
  - Mini ITX form factor.

Note

1. ***All specifications and images are subject to change without notice.***
2. ***The PCI-Express x16 slot supports riser card with up to 2 PCI-Express x8.***

1.3 Utilities Supported

- Chipset driver
- Ethernet driver
- Graphics driver
- Audio driver
- Intel® USB 3.0 driver
- RAID utility
- iAMT utility and driver

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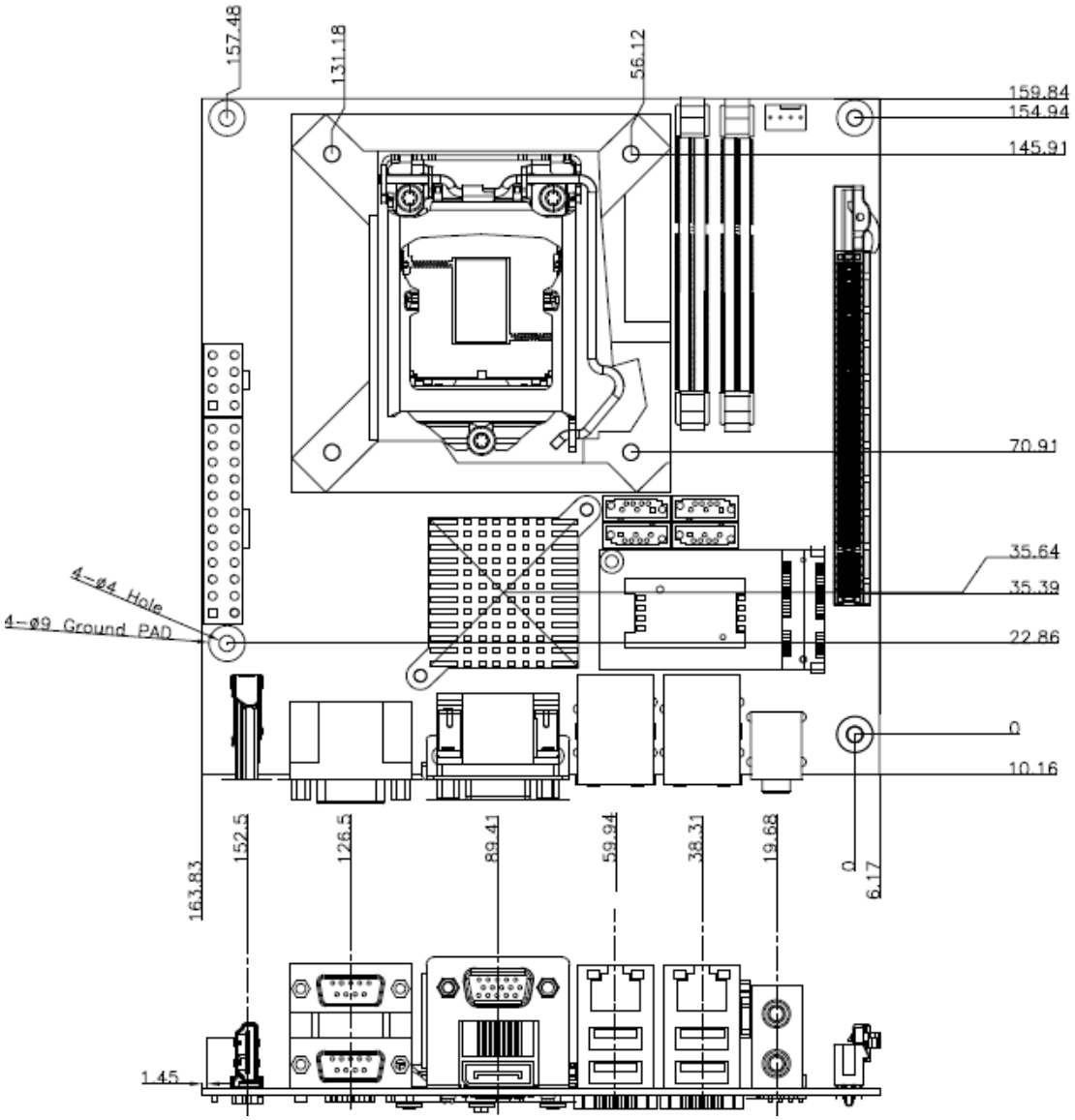
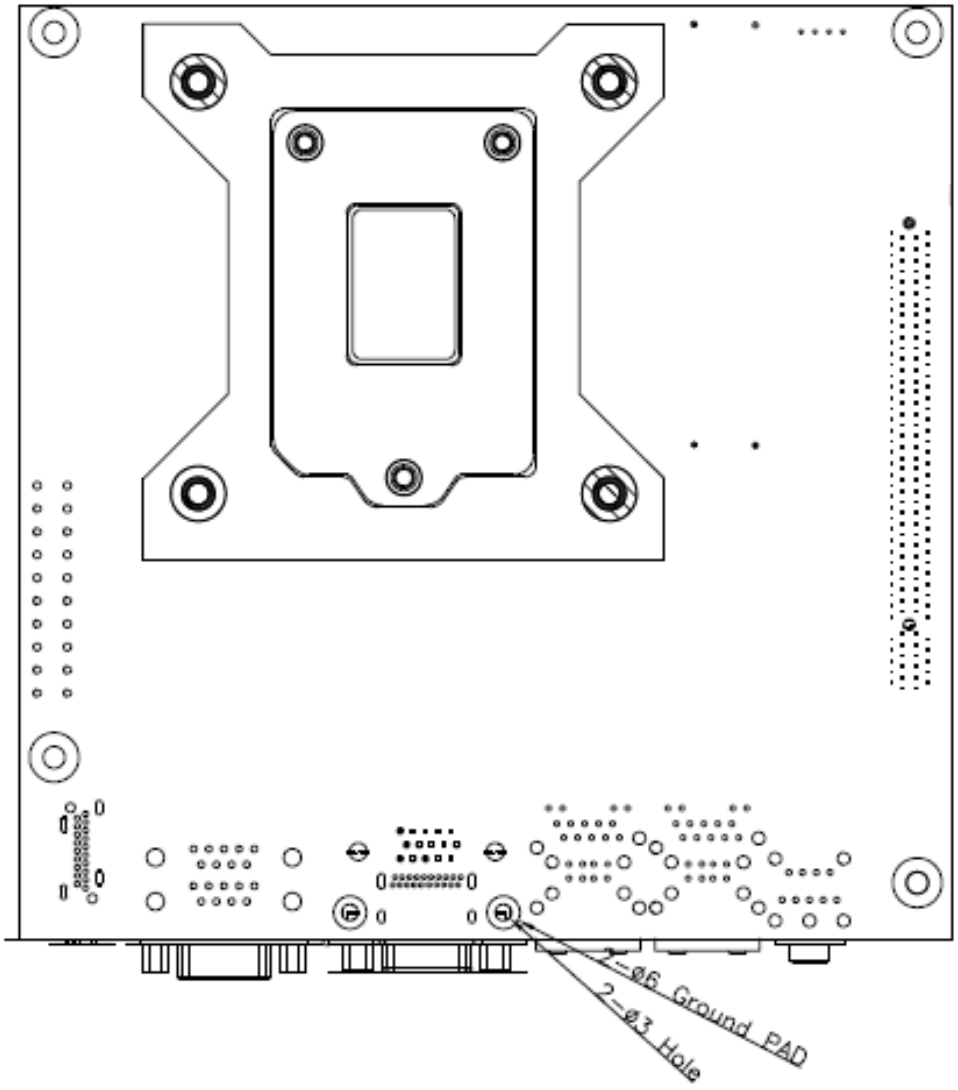
Chapter 2
Board and Pin Assignments

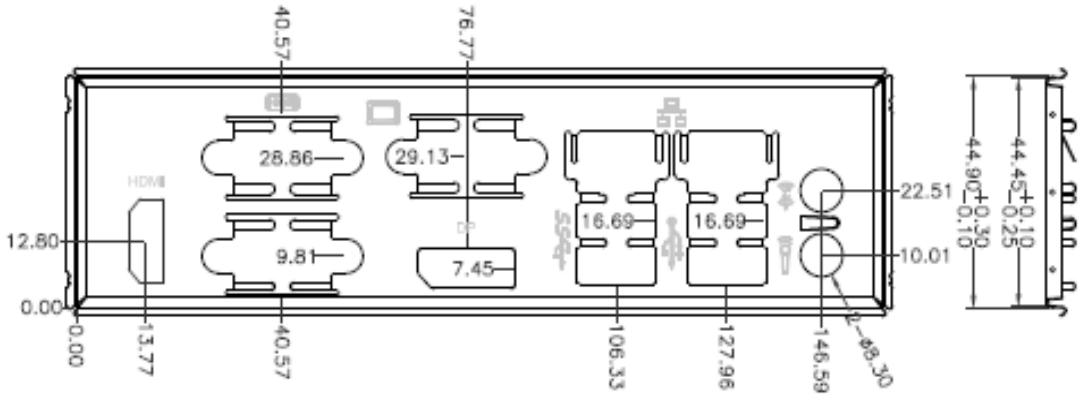
2.1 Board Dimensions and Fixing Holes



Top View

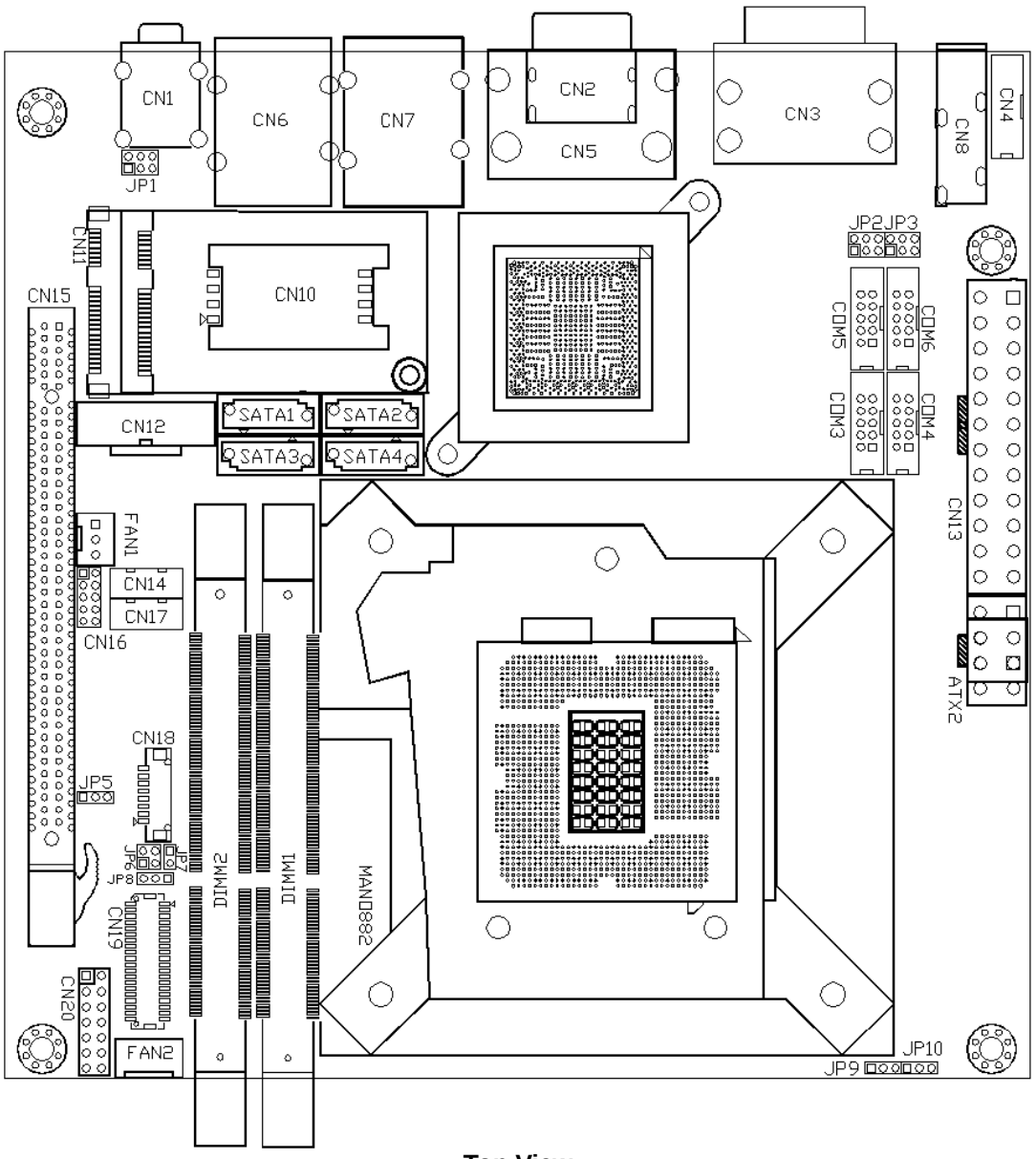


Bottom View

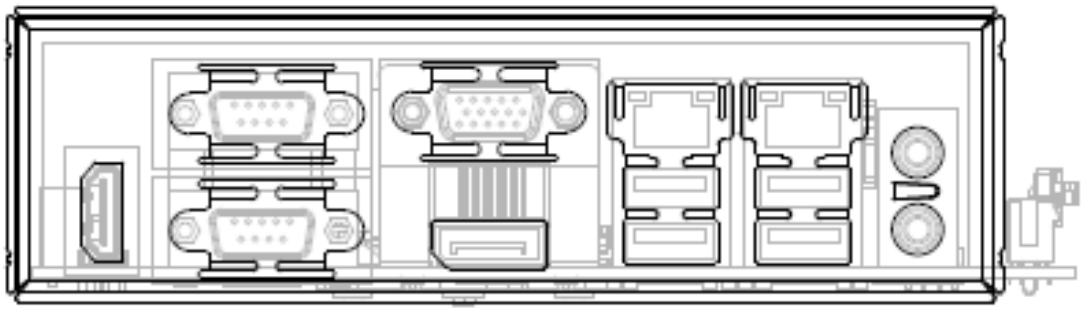


I/O Bracket

2.2 Board Layout



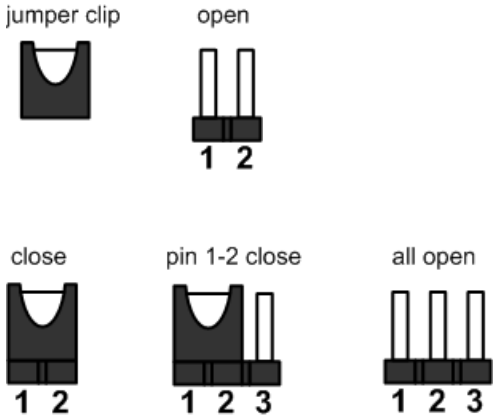
Top View



I/O Bracket

2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. The following illustration shows how to set up jumper.



Before applying power to MANO882 Series, please make sure all of the jumpers are in factory default position. Below you can find a summary table and onboard default settings.

Note

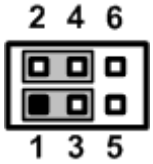
Once the default jumper setting needs to be changed, please do it under power-off condition.

Jumper	Description		Setting
JP1	Audio Output Selection Default: Line-out		1-3, 2-4 Close
JP2	COM2 Data/Power Selection Default: RS-232 Data	CN3B Pin 1: DCD	3-5 Close
		CN3B Pin 9: RI	4-6 Close
JP3	COM1 Data/Power Selection Default: RS-232 Data	CN3A Pin 1: DCD	3-5 Close
		CN3A Pin 9: RI	4-6 Close
JP5	Restore BIOS Optimal Defaults Default: Normal Operation		1-2 Close
JP6	LVDS Brightness Control Mode Setting Default: PWM Mode		1-2 Close
JP7 (Optional)	LVDS +12V Voltage Selection Default: NA		1-2 Open
JP8	LVDS Voltage Selection Default: +3.3V level		1-2 Close
JP9	Auto Power On Default: Disable		1-2 Close
JP10	PCI-Express Bifurcation Setting Default: One x16 PCI-Express		1-2 Close

2.3.1 Audio Output Selection (JP1)

Use this jumper to select line-out or speaker-out as source of audio output on audio connector. When speaker-out is used, it delivers 1W/channel continuous at 8Ω loads.

Function	Setting
Line-out (Default)	1-3, 2-4 close
Speaker-out (w/ amplifier)	3-5, 4-6 close

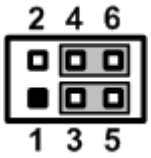


2.3.2 COM2 and COM1 Data/Power Selection (JP2 and JP3)

The COM2/COM1 port has +5V level power capability on DCD and +12V level on RI by setting jumper JP2/JP3. When this port is set to +5V or +12V level, please make sure its communication mode is RS-232. You can change the communication mode (RS-232/422/485) via BIOS setting, see section 5.4.

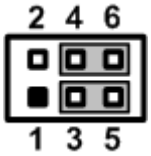
Function	JP2 Setting
Power: Set CN3B pin 1 to +5V level	1-3 close
Data: Set CN3B pin 1 to DCD (Default)	3-5 close
Power: Set CN3B pin 9 to +12V level	2-4 close
Data: Set CN3B pin 9 to RI (Default)	4-6 close

JP2



Function	JP3 Setting
Power: Set CN3A pin 1 to +5V level	1-3 close
Data: Set CN3A pin 1 to DCD (Default)	3-5 close
Power: Set CN3A pin 9 to +12V level	2-4 close
Data: Set CN3A pin 9 to RI (Default)	4-6 close

JP3



2.3.3 Restore BIOS Optimal Defaults (JP5)

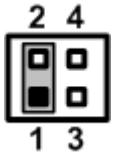
Put jumper clip to pin 2-3 for a few seconds then move it back to pin 1-2. Doing this procedure can restore BIOS optimal defaults.

Function	Setting
Normal operation (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close

2.3.4 LVDS Brightness Control Mode Setting (JP6)

This jumper enables you to select PWM or voltage control mode for inverter connector (CN18). These two control modes are for adjusting the brightness of LVDS panel.

Function	Setting
PWM mode (Default)	1-2 close
Voltage mode	3-4 close



2.3.5 LVDS +12V Voltage Selection (JP7) (Optional)

The board supports voltage selection for flat panel displays. Use JP7 to set LVDS connector (CN19) pin 1~6 VCCM to +12V level. To prevent hardware damage, before connecting please make sure that the input voltage of flat panel is correct.

Function	Setting
+12V level	1-2 close
NA (Default)	1-2 open

2.3.6 LVDS +3.3V/+5V Voltage Selection (JP8)

The board supports voltage selection for flat panel displays. Use JP8 to set LVDS connector (CN19) pin 1~6 VCCM to +3.3V or +5V. To prevent hardware damage, before connecting please make sure that the input voltage of flat panel is correct.

Function	Setting
+3.3V (Default)	1-2 close
+5V	2-3 close

2.3.7 Auto Power On (JP9)

If this jumper is enabled for power input, the system will be automatically power on without pressing soft power button. If this jumper is disabled for power input, it is necessary to manually press soft power button to power on the system.

Function	Setting
Disable auto power on (Default)	1-2 close
Enable auto power on	2-3 close

Note

This function is similar to the feature of power on after power failure, which is controlled by hardware circuitry instead of BIOS.

2.3.8 PCI-Express Bifurcation Setting (JP10)

JP10 is for PCI-Express bifurcation setting. See table below for detailed information.

Function	Setting
Set CN15 to one x16 PCI-Express (Default)	1-2 close
Set CN15 to two x8 PCI-Express	2-3 close

2.4 Connectors

Signals go to other parts of the system through connectors. Loose or improper connection might cause problems, please make sure all connectors are properly and firmly connected. Here is a summary table which shows all connectors on the hardware.

Connector	Description
CN1	Audio Jack
CN2	DisplayPort Connector
CN3	COM1 Connector (CN3A) and COM2 Connector (CN3B)
CN4	Internal PS/2 Keyboard and Mouse Connector
CN5	VGA Connector
CN6	LAN2 and USB 2.0 Port 1, 2
CN7	LAN1 and USB 3.0 Port 1, 2
CN8	HDMI Connector
CN10	SIM Card Slot
CN11	Full-size PCI-Express Mini Card and mSATA Connector
CN12	Internal USB 3.0 Port 3 and 4
CN13	24-pin ATX Power Connector
CN14	Internal USB 2.0 Port 3 and 4
CN15	PCI-Express x16 Slot
CN16	Digital I/O Connector
CN17	Internal USB 2.0 Port 5 and 6
CN18	Inverter Connector
CN19	LVDS Connector
CN20	Front Panel Connector
ATX2	8-pin +12V ATX Power Connector
COM3~COM6	Internal COM3~COM6 Connectors
FAN1	System Fan Connector
FAN2	CPU Fan Connector
SATA1~SATA4	SATA 3.0 Connectors
DIMM1~DIMM2	DDR3 SO-DIMM Connectors

2.4.1 Audio Jack (CN1)

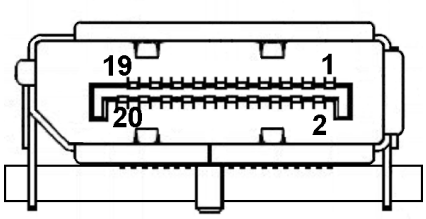
The board provides HD audio jack on the rear I/O. Install audio driver, and then attach audio devices to CN1.

Pin Color	Signal
Green	Line-out
Pink	MIC-in

2.4.2 DisplayPort Connector (CN2)

The DisplayPort interface is available through CN2.

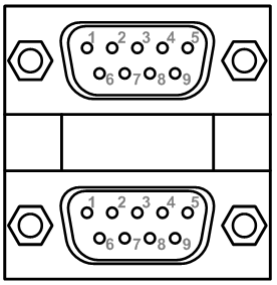
Pin	Signal
1	DPB_LANE0
2	GND
3	DPB_LANE0#
4	DPB_LANE1
5	GND
6	DPB_LANE1#
7	DPB_LANE2
8	GND
9	DPB_LANE2#
10	DPB_LANE3
11	GND
12	DPB_LANE3#
13	Detect Pin
14	GND
15	DPB_AUX
16	GND
17	DPB_AUX#
18	DPB_HPDE
19	GND
20	+3.3V



2.4.3 COM1 and COM2 Connector (CN3)

CN3 is a double-deck DB-9 connector. Both CN3A (for COM1) and CN3B (for COM2) come with power capability on DCD and RI pins by setting jumpers (see section 2.3.2). The pin assignments of RS-232/RS-422/RS-485 are listed in table below. If you need COM1/COM2 port to support RS-422 or RS-485, please refer to section 5.4.

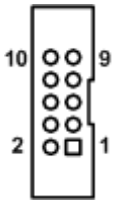
Pin	RS-232	RS-422	RS-485
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	No use
4	DTR	RX-	No use
5	GND	No use	No use
6	DSR	No use	No use
7	RTS	No use	No use
8	CTS	No use	No use
9	RI	No use	No use



2.4.4 Internal PS/2 Keyboard and Mouse Connector (CN4)

The PS/2 keyboard and mouse interface is available through CN4.

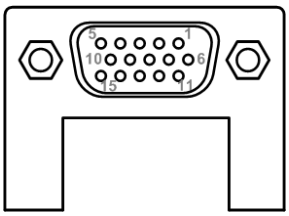
Pin	Signal	Pin	Signal
1	KBVCC	2	K/B Data
3	K/B CLK	4	PS2_GND
5	KBVCC	6	KBVCC
7	M/S Data	8	M/S CLK
9	PS2_GND	10	N.C.



2.4.5 VGA Connector (CN5)

The CN5 is a high rise 15-pin D-Sub connector which is commonly used for VGA monitor. This VGA interface configuration can be configured via software utility.

Pin	Signal	Pin	Signal
1	Red	2	Green
3	Blue	4	N.C.
5	GND	6	DETECT
7	GND	8	GND
9	VCC	10	GND
11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync
15	DDC CLK		



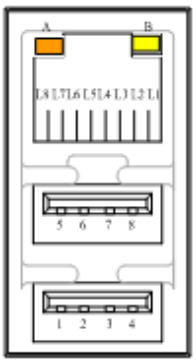
2.4.6 LAN and USB Connectors (CN6 and CN7)

The board comes with two high performance plug and play ethernet interfaces (RJ-45) which are fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

The CN6 has lower double-deck connector for USB 2.0 port 1 and 2.

Pin	LAN2 Signal	Pin	USB Signal
L1	MDI0+	1	+5V standby power
L2	MDI0-	2	USB D1-
L3	MDI1+	3	USB D1+
L4	MDI1-	4	Ground (GND)
L5	MDI2+	5	+5V standby power
L6	MDI2-	6	USB D2-
L7	MDI3+	7	USB D2+
L8	MDI3-	8	Ground (GND)
A	100 LAN LED (Green)/1000 LAN LED (Orange)		
B	Active LED (Yellow)		

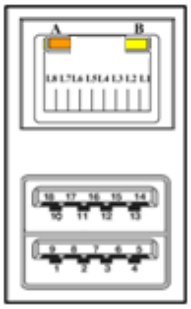
CN6



The CN7 has lower double-deck connector for USB 3.0 port 1 and 2.

Pin	LAN1 Signal	Pin	LAN1 Signal
L1	MDI0+	L5	MDI2+
L2	MDI0-	L6	MDI2-
L3	MDI1+	L7	MDI3+
L4	MDI1-	L8	MDI3-
A	100 LAN LED (Green)/1000 LAN LED (Orange)		
B	Active LED (Yellow)		

CN7

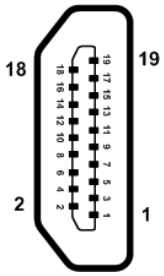


Pin	USB Signal	Pin	USB Signal
1	USB_VCC (+5V standby power)	10	USB_VCC (+5V standby power)
2	USB_Data0-	11	USB_Data1-
3	USB_Data0+	12	USB_Data1+
4	GND	13	GND
5	SSRX1-	14	SSRX2-
6	SSRX1+	15	SSRX2+
7	GND	16	GND
8	SSTX1-	17	SSTX2-
9	SSTX1+	18	SSTX2+

2.4.7 HDMI Connector (CN8)

The HDMI (High-Definition Multimedia Interface) interface is available through this connector.

Pin	Signal	Pin	Signal
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_Clock+
11	GND	12	HDMI OUT_Clock-
13	N.C.	14	N.C.
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HTPLG		



2.4.8 SIM Card Slot (CN10)

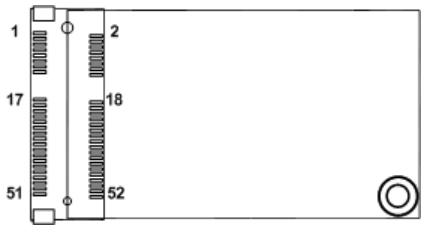
The CN10 is for inserting SIM Card. It is mainly used in 3G wireless network application. In order to work properly, the SIM Card must be used together with 3G module which is inserted to CN11.

Pin	Signal
1	PWR
2	RST
3	CLK
4	NC
5	GND
6	VPP
7	I/O
8	NC

2.4.9 Full-size PCI-Express Mini Card and mSATA Connector (CN11)

This is a PCI-Express Mini Card connector applying to either PCI-Express or USB 2.0 or SATA (mSATA). It complies with PCI-Express Mini Card Spec. V1.2. It can also support mSATA card. Please refer to BIOS setting in section 5.4 to enable or disable mSATA support.

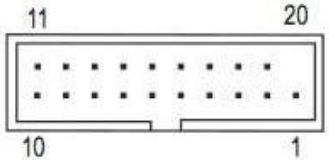
Pin	Signal	Pin	Signal
1	WAKE#	2	+3.3VSB
3	No use	4	GND
5	No use	6	+1.5V
7	CLKREQ#	8	PWR
9	GND	10	I/O
11	REFCLK-	12	CLK
13	REFCLK+	14	RST
15	GND	16	VPP
17	No use	18	GND
19	No use	20	W_DISABLE#
21	GND	22	PERST#
23	PE_RXN/ SATA_RXP	24	+3.3VSB
25	PE_RXP/ SATA_RXN	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PE_TXN/ SATA_TXN	32	SMB_DATA
33	PE_TXP/ SATA_TXP	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3VSB	40	GND
41	+3.3VSB	42	No use
43	GND	44	No use
45	No use	46	No use
47	No use	48	+1.5V
49	No use	50	GND
51	No use	52	+3.3VSB



2.4.10 Internal USB 3.0 Connector (CN12)

The CN12 is a 19-pin internal connector for installing versatile USB 3.0 compliant peripherals.

Pin	Signal	Pin	Signal
1	VBUS0		
2	SSRX3-	19	VBUS1
3	SSRX3+	18	SSRX4-
4	GND	17	SSRX4+
5	SSTX3-	16	GND
6	SSTX3+	15	SSTX4-
7	GND	14	SSTX4+
8	USB6-	13	GND
9	USB6+	12	USB7-
10	ID	11	USB7+



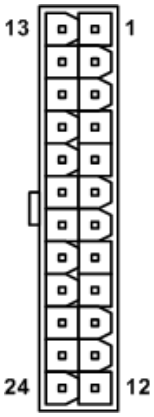
2.4.11 ATX Power Connectors (CN13 and ATX2)

Steady and sufficient power can be supplied to all components on the board by connecting power connector. Please make sure all components and devices are properly installed before connecting the power connector.

External power supply plug fits into this connector in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

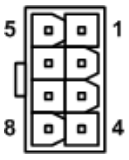
The CN13 is a 24-pin ATX power connector. Its pin assignments are given in table below.

Pin	Signal	Pin	Signal
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWR OK	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND



The ATX2 is an 8-pin +12V ATX power connector for connecting CPU core voltage.

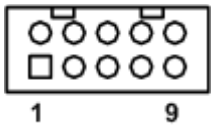
Pin	Signal	Pin	Signal
1	GND	5	+12V
2	GND	6	+12V
3	GND	7	+12V
4	GND	8	+12V



2.4.12 Internal USB 2.0 Connectors (CN14 and CN17)

These are 2x5-pin internal connectors for installing versatile USB 2.0 compliant peripherals. These connectors are designed with +5V level standby power which can provide power when system is in suspend mode.

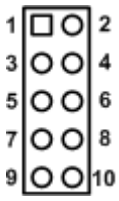
Pin	Signal	Pin	Signal
1	USB VCC (+5V level standby power)	2	USB VCC (+5V level standby power)
3	USB DX-	4	USB DY-
5	USB DX+	6	USB DY+
7	GND	8	GND
9	GND	10	GND



2.4.13 Digital I/O Connector (CN16)

The board is equipped with an 8-channel digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. You may use software programming to control these digital signals.

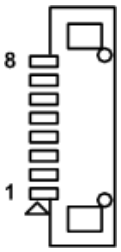
Pin	Signal	Pin	Signal
1	DIO 5	2	DIO 1
3	DIO 6	4	DIO 2
5	DIO 7	6	DIO 3
7	DIO 8	8	DIO 4
9	GND	10	GND



2.4.14 Inverter Connector (CN18)

The CN18 is an 8-pin connector for inverter. We strongly recommend you to use the matching DF13-8S-1.25C connector to avoid malfunction.

Pin	Signal
1	VBL1 (+12V level)
2	VBL1 (+12V level)
3	VBL2 (+5V level)
4	VBL_ENABLE
5	GND
6	GND
7	GND
8	LVDS_BRICTL

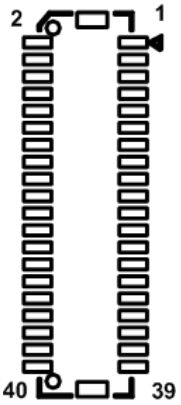


2.4.15 LVDS Connector (CN19)

This board has a 2x20-pin connector for LVDS LCD interface. It is strongly recommended to use the matching JST SHDR-40VS-B connector for LVDS interface. Pin 1~6 VCCM can be set to +3.3V, +5V or +12V by setting JP8 or JP7 (see section 2.3.6 and 2.3.5).

18-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	EDID DATA	8	EDID CLK
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND



24-bit single channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	EDID DATA	8	EDID CLK
9	GND	10	GND
11	N.C.	12	N.C.
13	N.C.	14	N.C.
15	GND	16	GND
17	N.C.	18	N.C.
19	N.C.	20	N.C.
21	GND	22	GND
23	Channel A D0-	24	N.C.
25	Channel A D0+	26	N.C.
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

18-bit dual channel

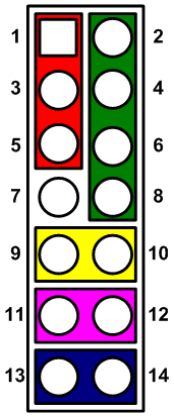
Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	EDID DATA	8	EDID CLK
9	GND	10	GND
11	N.C.	12	Channel B D0-
13	N.C.	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	N.C.
31	Channel A D1+	32	N.C.
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

24-bit dual channel

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	EDID DATA	8	EDID CLK
9	GND	10	GND
11	Channel B D3-	12	Channel B D0-
13	Channel B D3+	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3-
31	Channel A D1+	32	Channel A D3+
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND

2.4.16 Front Panel Connector (CN20)

Pin	Signal
1	PWRLED+
2	EXT SPK-
3	GND
4	Buzzer
5	PWRLED-
6	N.C.
7	N.C.
8	EXT SPK+
9	PWRSW-
10	PWRSW+
11	HW RST-
12	HW RST+
13	HDDLED-
14	HDDLED+



Power LED
Pin 1 connects anode(+) of LED and pin 5 connects cathode(-) of LED. The power LED lights up when the system is powered on. The pin 3 is defined as GND.

External Speaker and Internal Buzzer
Pin 2, 4, 6 and 8 connect the case-mounted speaker unit or internal buzzer. While connecting the board to an internal buzzer, please set pin 2 and 4 closed; while connecting to an external speaker, you need to set pins 2 and 4 opened and connect the speaker cable to pin 8(+) and pin 2(-).

Power On/Off Button
Pin 9 and 10 connect the power button on front panel to the board, which allows users to turn on or off power supply.

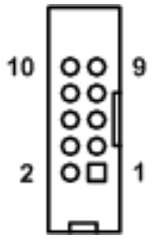
System Reset Switch
Pin 11 and 12 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED
This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, pin 13 is assigned as cathode(-) and pin 14 is assigned as anode(+).

2.4.17 Internal COM Connectors (COM3~COM6)

The board comes with 2x5-pin connectors for COM3~COM6 serial port interfaces, see table below.

Pin	Signal
1	Data Carrier Detect (DCD)
2	Data Set Ready (DSR)
3	Receive Data (RXD)
4	Request to Send (RTS)
5	Transmit Data (TXD)
6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)
8	Ring Indicator (RI)
9	Ground (GND)
10	NC

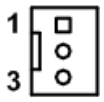


2.4.18 FAN Connectors (FAN1 and FAN2)

Fans are always needed for cooling down CPU and system temperature. The board has two fan connectors. You can find fan speed option(s) at BIOS Setup Utility if either fan is installed. For further information, see BIOS Setup Utility: Advanced\HW Monitor\PC Health Status.

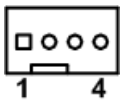
The FAN1 is for system fan interface, see table below.

Pin	Signal
1	GND
2	+12V level
3	Sensor



The FAN2 is for CPU fan interface, see table below.

Pin	Signal
1	GND
2	+12V level
3	Rotation detection
4	Speed control

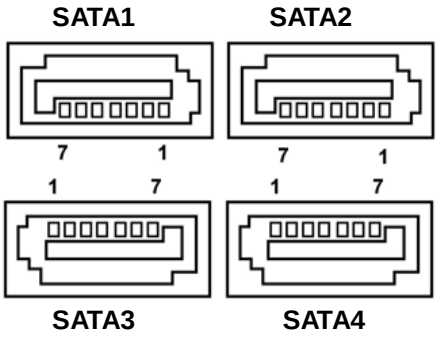


2.4.19 SATA 3.0 Connectors (SATA1~SATA4)

These Serial Advanced Technology Attachment (Serial ATA or SATA) connectors are for high-speed SATA interfaces. They are computer bus interfaces for connecting to devices such as hard disk drives.

This board has four SATA 3.0 ports with 6Gb/s performance.

Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



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Chapter 3
Hardware Installation

Before installing the processor, please access Intel® website for more detail information of Processor Integration Video (LGA1150)**:**

http://www.intel.com/support/tw/processors/sb/CS-030860.htm .

3.1 Installing the Processor

The LGA1150 processor socket comes with a cover to protect the processor. Please install the processor into the CPU socket step by step as below:

Step1 Opening the socket:

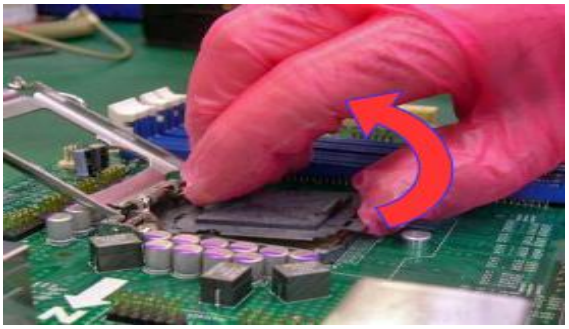
- Disengage load lever by releasing down and out on the hook. This will clear retention tab.
- Rotate load lever to open position at approximately 135°.
- Rotate load plate to open position at approximately 150°.

Note

Apply pressure to corner with right-hand thumb when opening or closing load lever - otherwise lever will bounce back (as a mouse trap) causing bent contacts.

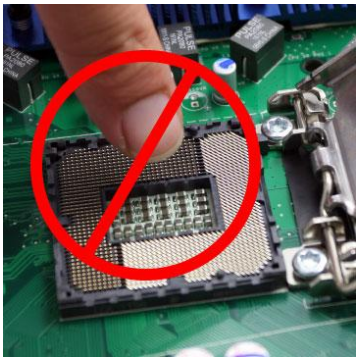
Step2 Removing the socket protective cover:

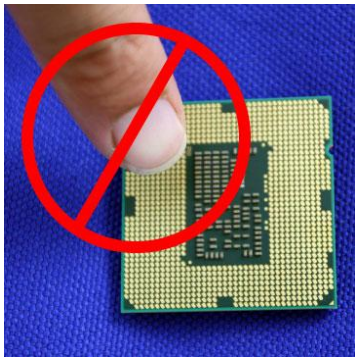
- Place thumb against the front edge of the protective cover and rest index finger on the rear grip to maintain control of the cover.
- Lift the front edge of the protective cover to disengage from the socket. Keep control of the cover by holding the rear grip with index finger.
- Lift protective cover away from the socket, being careful not to touch the electrical contacts.



Note

Vertical removal is NOT recommended, as it requires higher force and can lead to socket contact damage.



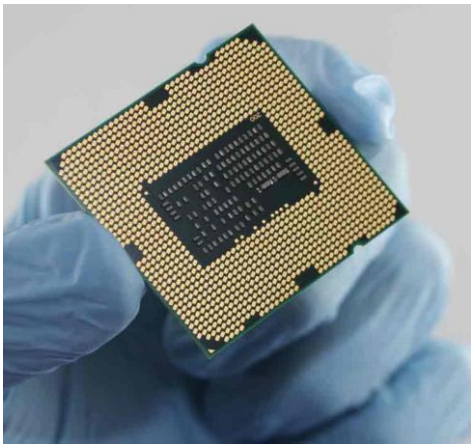


Caution

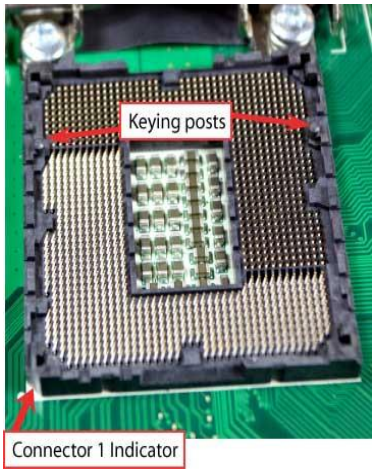
Never touch fragile socket contacts to avoid damage and do not touch processor sensitive contacts at any time during installation.

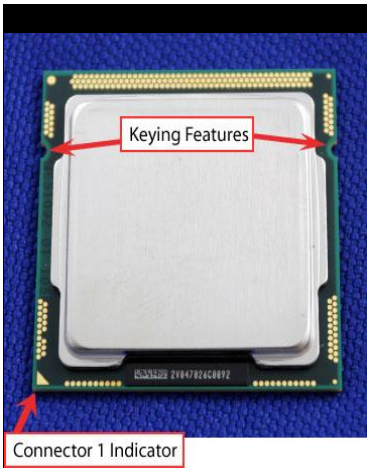
Step3 Processor installation:

- Lift processor package from shipping media by grasping the substrate edges.



- Scan the processor package gold pads for any presence of foreign material. If necessary, the gold pads can be wiped clean with a soft lint-free cloth and isopropyl alcohol.
- Locate connection 1 indicator on the processor which aligns with connection 1 indicator chamfer on the socket, and notice processor keying features that line up with posts along socket walls.





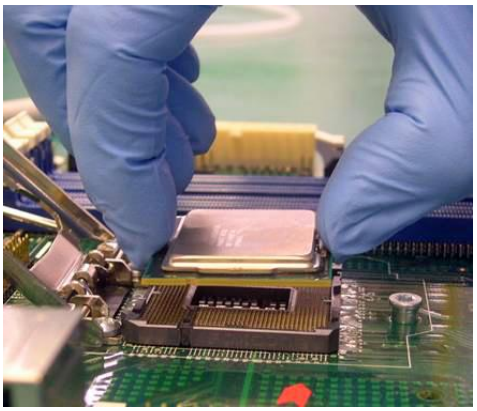
- Grasp the processor with thumb and index finger along the top and bottom edges. (Do not touch the orientation notches.) The socket will have cutouts for your fingers to fit into (see image below).
- Carefully place the processor into the socket body vertically (see image below).

Note

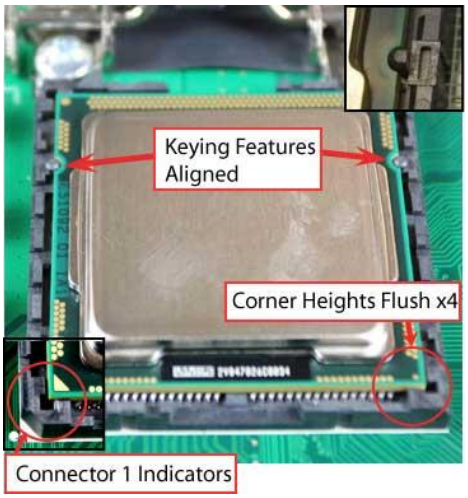
Tilting or roughly shifting it into place can damage socket contacts.

Caution

Do not use a vacuum pen for installation.

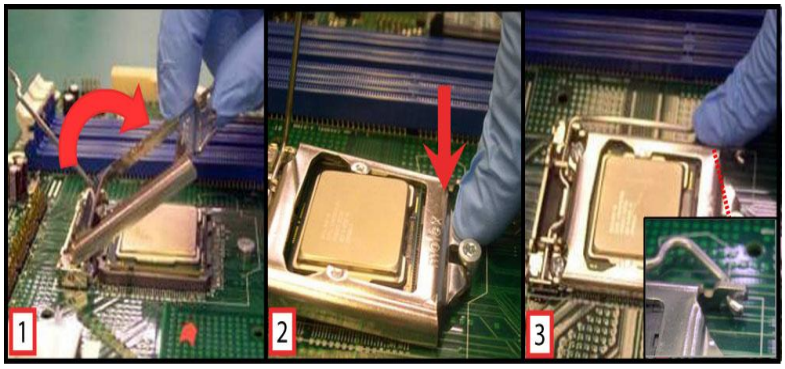


- Verify that package is within the socket body and properly connected to orientation keys.



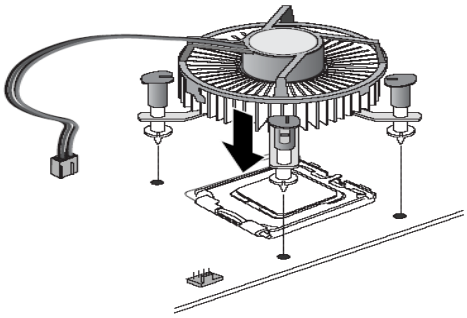
- Close the socket (see image below):

1. Gently lower the load plate.
2. Make sure load plate's front edge slides under the shoulder screw cap as the lever is lowered.
3. Latch the lever under the top plate's corner tab, being cautious not to damage the motherboard with the tip of the lever.

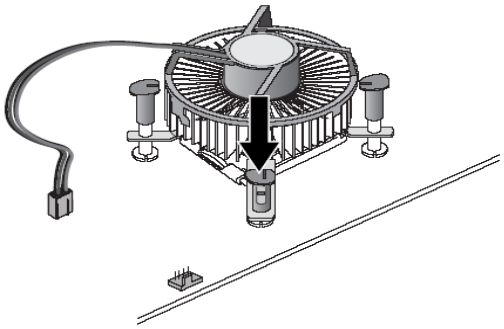


Step4 Fan heatsink handling:

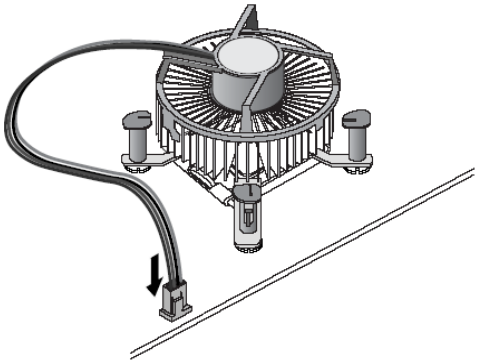
1. Orientate the CPU cooling fan to fixing holes on the board.



2. Screw the CPU cooling fan onto the board.



3. Make sure the CPU fan is plugged to the CPU fan connector.

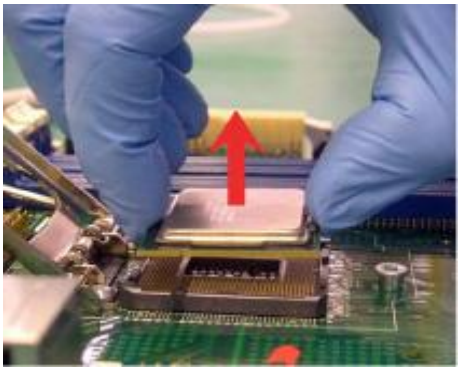


Step5 Removing the processor:

- Open the socket:

  1. Disengage the load lever.
  2. Open the load plate

- Remove the Processor package, holding along the top and bottom edges, or by using a vacuum pen.
- Maintain Processor horizontal and remove Processor with a vertical motion to avoid damaging the socket contacts.

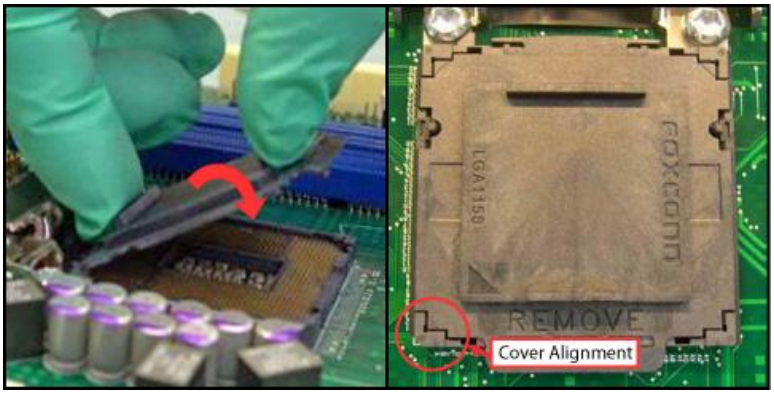


- Place the processor in a specially designed tray or ESD retainer for storage. Do not place directly on table resting on gold lands
- Assemble LGA1150 socket protective cover:

1. Hold protective cover at 45 degree angle to the LGA1150 Socket.
2. Carefully lower protective cover on hinge side first, to contact with the outside wall of the LGA1150 Socket:
3. Engage protective cover retention features to outside of LGA1150 Socket, and align 2 cover corners to socket corners (This step is critical to avoid Bent Contact Damage!).
4. Lower protective cover to attach to the LGA1150 Socket on Shoulder screw side.

- Perform Visual and Tactile verification that protective cover is properly seated in the LGA1150 Socket:

  Hold cover and move gently “side by side” to feel the play within the cover and the LGA1150 Socket.



- Close the socket load plate and engage the load lever (see image below).

3.2 Installing the Memory

The board has two 204-pin DDR3 SO-DIMM memory sockets with maximum memory capacity up to 16GB.

Note

A DDR3 module has the same physical dimensions as a DDR2 SO-DIMM but is notched differently to prevent installation on a DDR2 SO-DIMM socket.

Please follow steps below to install the memory modules:

- Push down latches on each side of the SO-DIMM socket.
- Align the memory module with the socket that notches of memory module must match the socket keys for a correct installation.
- Install the memory module into the socket and push it firmly down until it is fully seated. The socket latches are levered upwards and clipped on to the edges of the SO-DIMM.
- Install any remaining SO-DIMM modules.

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Chapter 4
Hardware Description

4.1 Microprocessors

The MANO882 Series supports Intel® Xeon® E3/ Core™ i7 /i5 /i3 /Celeron® processors, which enable your system to operate under Windows® 7, Windows® 8 and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

4.2 BIOS

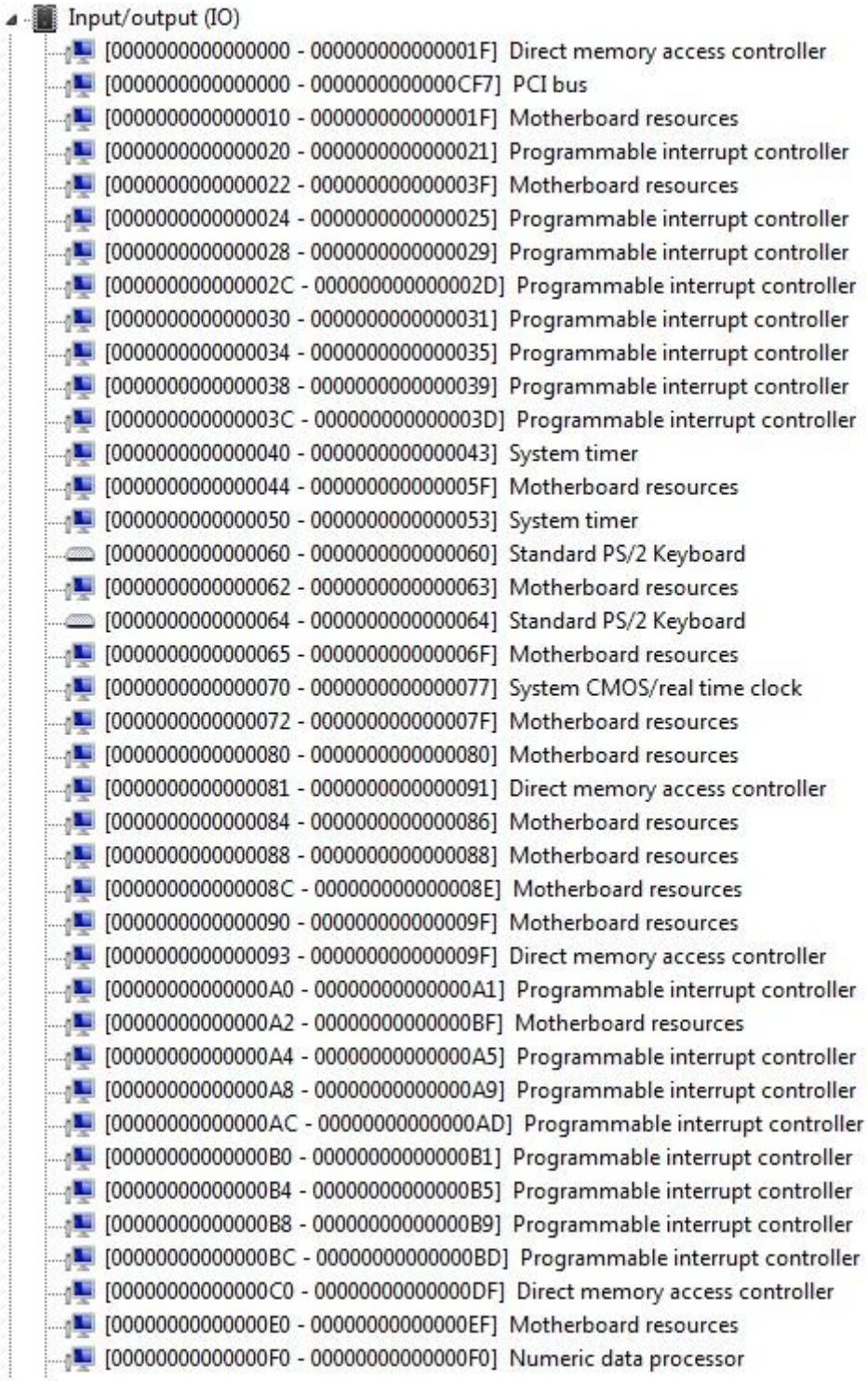
The MANO882 Series uses AMI Plug and Play BIOS with a single SPI Flash.

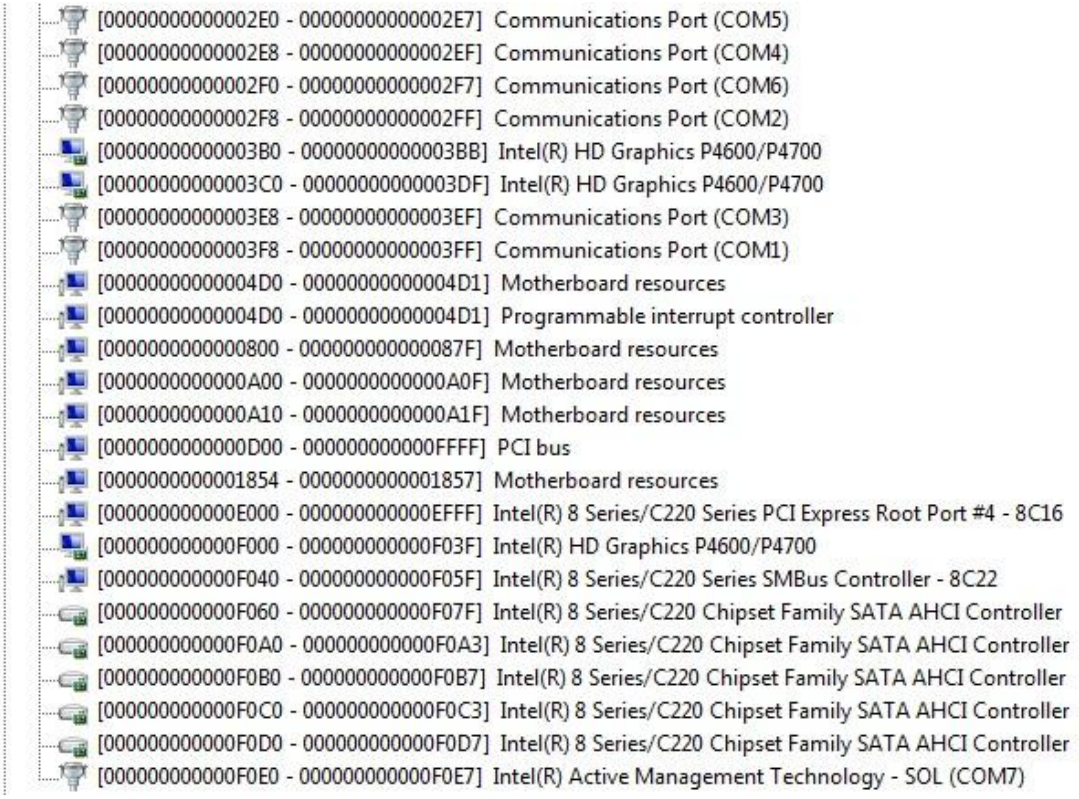
4.3 System Memory

The MANO882 Series supports two 204-pin DDR3 SO-DIMM sockets for maximum memory capacity up to 16GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB, 4GB and 8GB.

4.4 I/O Port Address Map

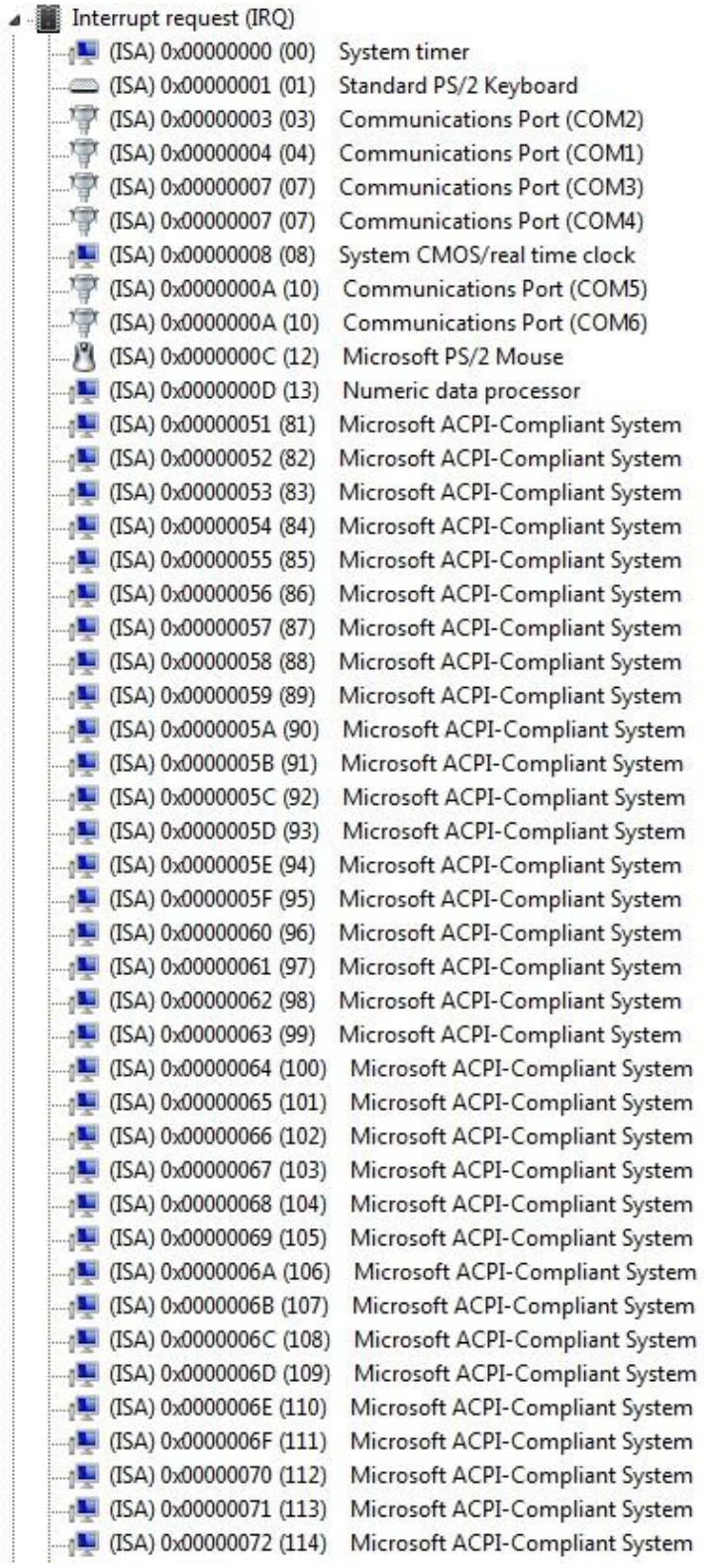
The Intel® Xeon® E3/ Core™ i7 /i5 /i3 /Celeron® processors communicate via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.

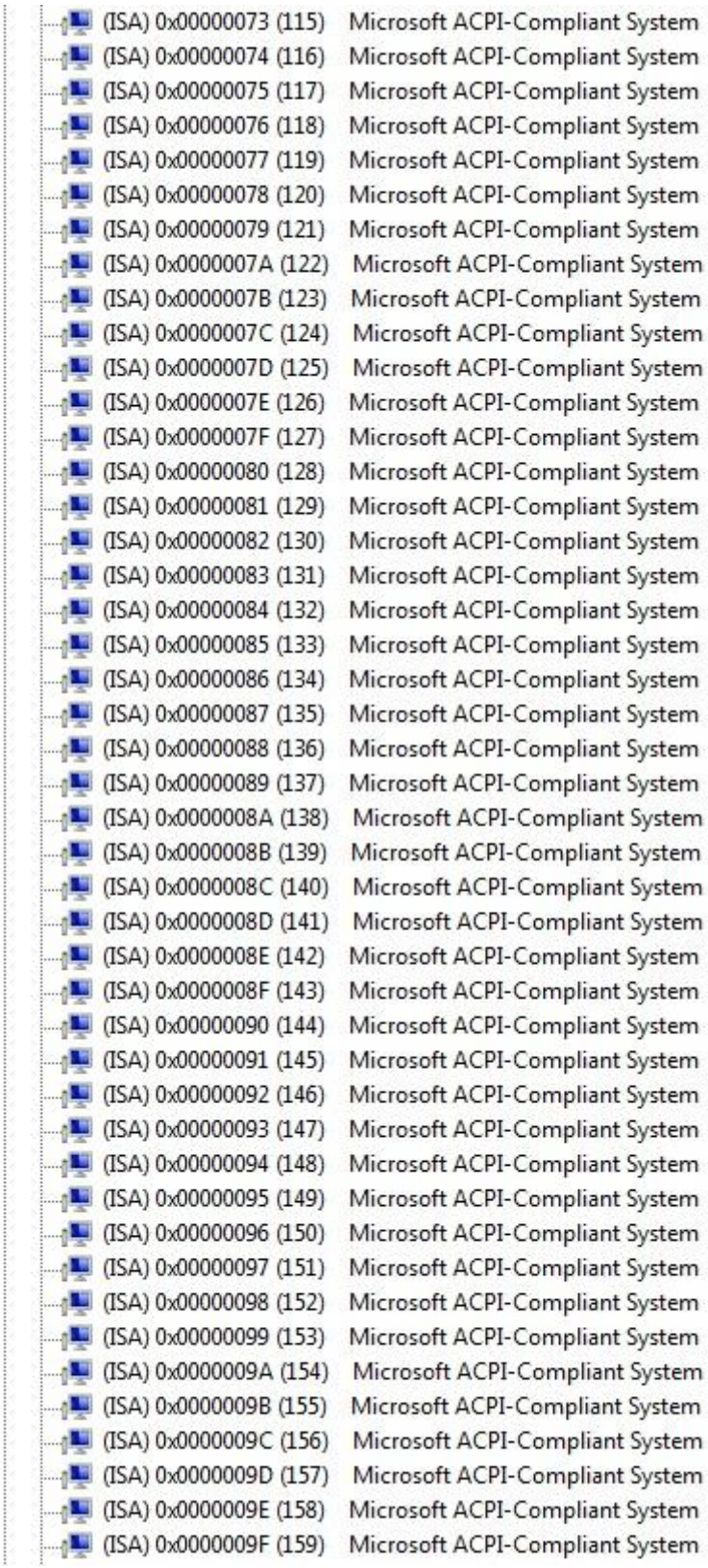


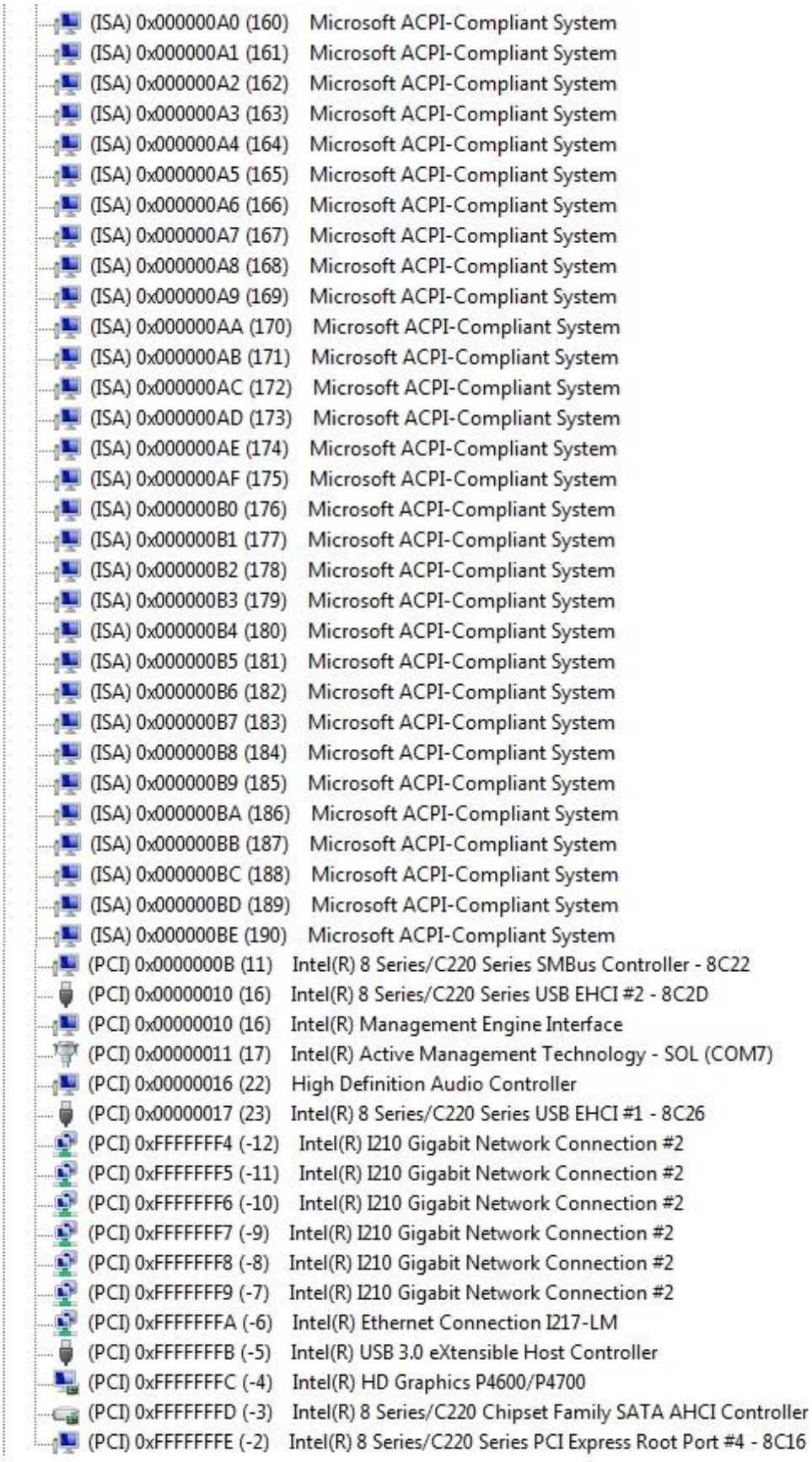

[00000000000002E0 - 00000000000002E7] Communications Port (COM5)
[00000000000002E8 - 00000000000002EF] Communications Port (COM4)
[00000000000002F0 - 00000000000002F7] Communications Port (COM6)
[00000000000002F8 - 00000000000002FF] Communications Port (COM2)
[00000000000003B0 - 00000000000003BB] Intel(R) HD Graphics P4600/P4700
[00000000000003C0 - 00000000000003DF] Intel(R) HD Graphics P4600/P4700
[00000000000003E8 - 00000000000003EF] Communications Port (COM3)
[00000000000003F8 - 00000000000003FF] Communications Port (COM1)
[00000000000004D0 - 00000000000004D1] Motherboard resources
[00000000000004D0 - 00000000000004D1] Programmable interrupt controller
[0000000000000800 - 000000000000087F] Motherboard resources
[0000000000000A00 - 0000000000000A0F] Motherboard resources
[0000000000000A10 - 0000000000000A1F] Motherboard resources
[0000000000000D00 - 000000000000FFFF] PCI bus
[0000000000001854 - 0000000000001857] Motherboard resources
[000000000000E000 - 000000000000EFFF] Intel(R) 8 Series/C220 Series PCI Express Root Port #4 - 8C16
[000000000000F000 - 000000000000F03F] Intel(R) HD Graphics P4600/P4700
[000000000000F040 - 000000000000F05F] Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[000000000000F060 - 000000000000F07F] Intel(R) 8 Series/C220 Chipset Family SATA AHCI Controller
[000000000000F0A0 - 000000000000F0A3] Intel(R) 8 Series/C220 Chipset Family SATA AHCI Controller
[000000000000F0B0 - 000000000000F0B7] Intel(R) 8 Series/C220 Chipset Family SATA AHCI Controller
[000000000000F0C0 - 000000000000F0C3] Intel(R) 8 Series/C220 Chipset Family SATA AHCI Controller
[000000000000F0D0 - 000000000000F0D7] Intel(R) 8 Series/C220 Chipset Family SATA AHCI Controller
[000000000000F0E0 - 000000000000F0E7] Intel(R) Active Management Technology - SOL (COM7)

4.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:

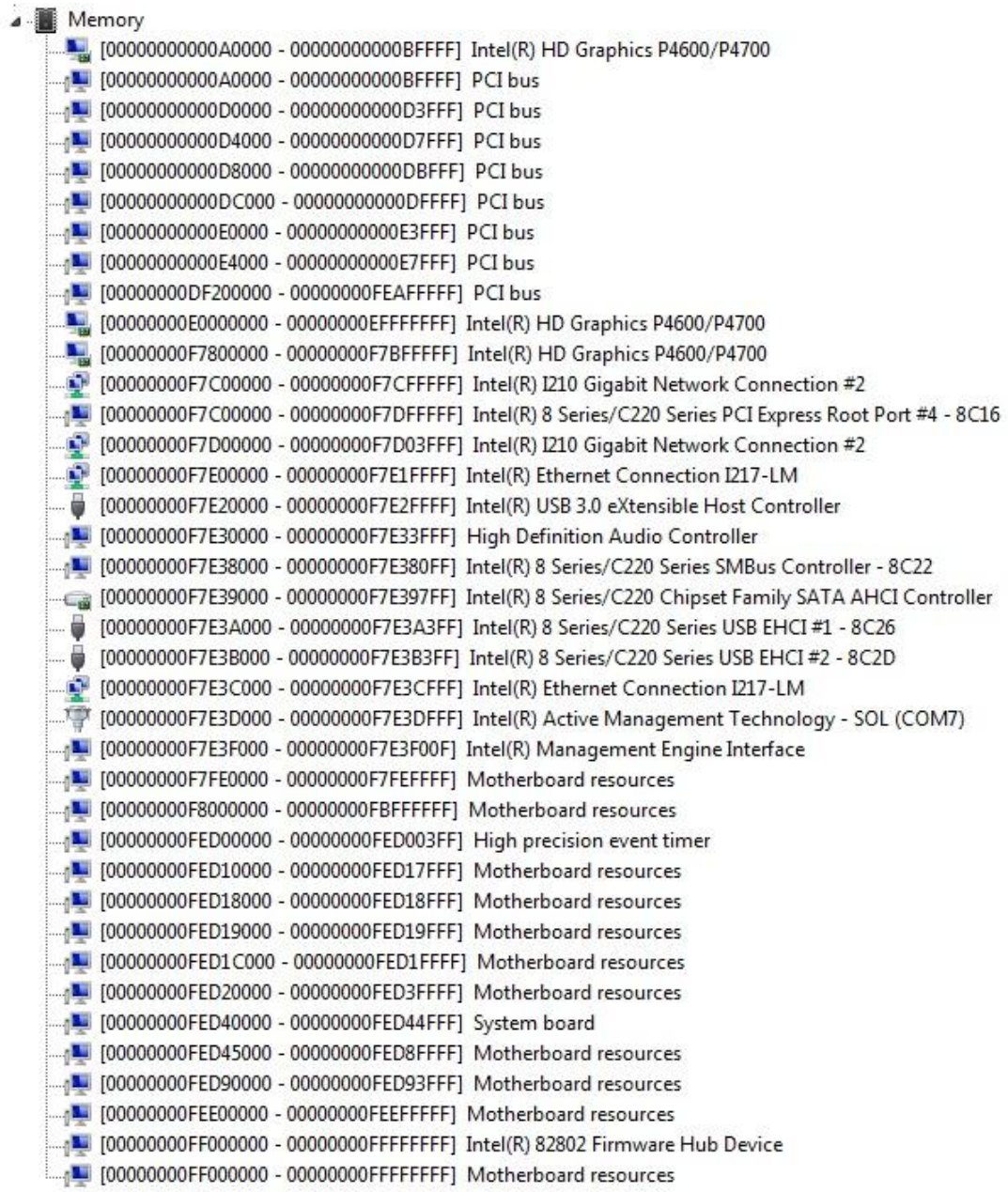



(ISA) 0x00000073 (115) Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116) Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117) Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118) Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119) Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120) Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121) Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122) Microsoft ACPI-Compliant System
(ISA) 0x0000007B (123) Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124) Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125) Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126) Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127) Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128) Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129) Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130) Microsoft ACPI-Compliant System
(ISA) 0x00000083 (131) Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132) Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134) Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135) Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154) Microsoft ACPI-Compliant System
(ISA) 0x0000009B (155) Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158) Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159) Microsoft ACPI-Compliant System


(ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169) Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170) Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171) Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172) Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173) Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179) Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180) Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182) Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183) Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184) Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186) Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187) Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188) Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189) Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190) Microsoft ACPI-Compliant System
(PCI) 0x0000000B (11) Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
(PCI) 0x00000010 (16) Intel(R) 8 Series/C220 Series USB EHCI #2 - 8C2D
(PCI) 0x00000010 (16) Intel(R) Management Engine Interface
(PCI) 0x00000011 (17) Intel(R) Active Management Technology - SOL (COM7)
(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0x00000017 (23) Intel(R) 8 Series/C220 Series USB EHCI #1 - 8C26
(PCI) 0xFFFFFFF4 (-12) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF5 (-11) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF6 (-10) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF7 (-9) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF8 (-8) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF9 (-7) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFFA (-6) Intel(R) Ethernet Connection I217-LM
(PCI) 0xFFFFFFFB (-5) Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFFFC (-4) Intel(R) HD Graphics P4600/P4700
(PCI) 0xFFFFFFFD (-3) Intel(R) 8 Series/C220 Chipset Family SATA AHCI Controller
(PCI) 0xFFFFFFFE (-2) Intel(R) 8 Series/C220 Series PCI Express Root Port #4 - 8C16

4.6 Memory Map

The memory mapping list is shown as follows:



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Chapter 5
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

5.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting JP5 (see section 2.3.3).

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

5.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

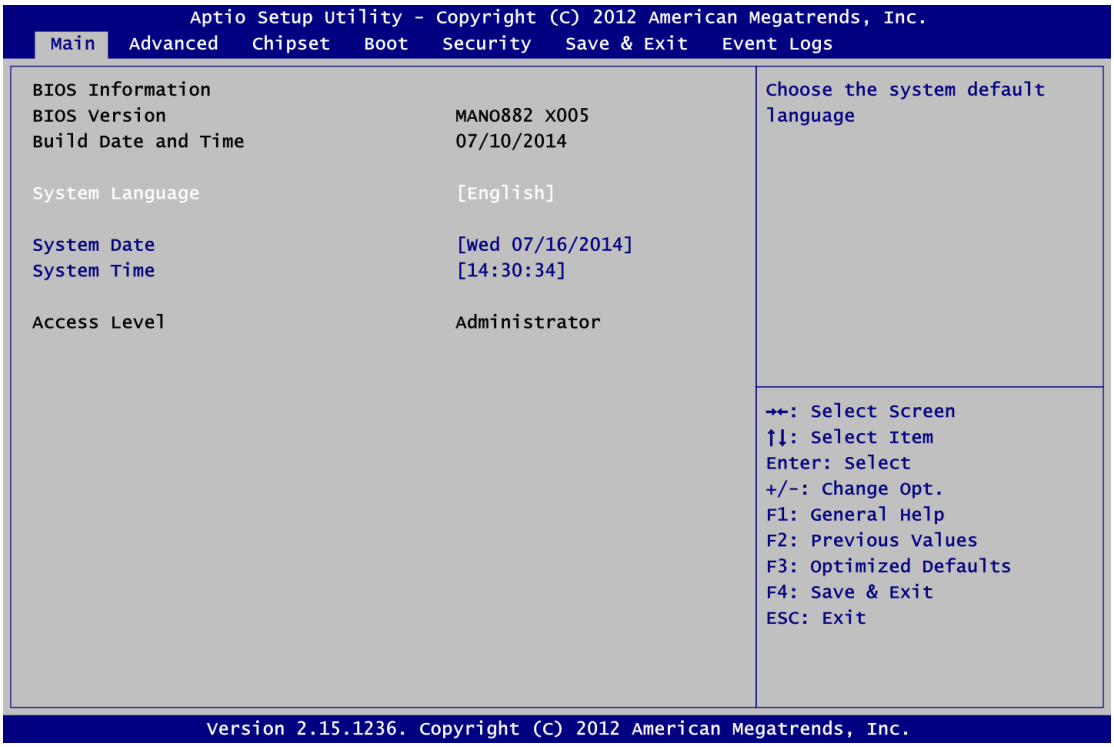
Note

Some of the navigation keys differ from one screen to another.

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.
F2	The <F2> key allows you to Load Previous Values.
F3	The <F3> key allows you to Load Optimized Defaults.
F4	The <F4> key allows you to save any changes you have made and exit Setup. Press the <F4> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

5.3 Main Menu

The first time you enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.



BIOS Information
Display the auto-detected BIOS information.

System Language
Choose the system default language.

System Date/Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

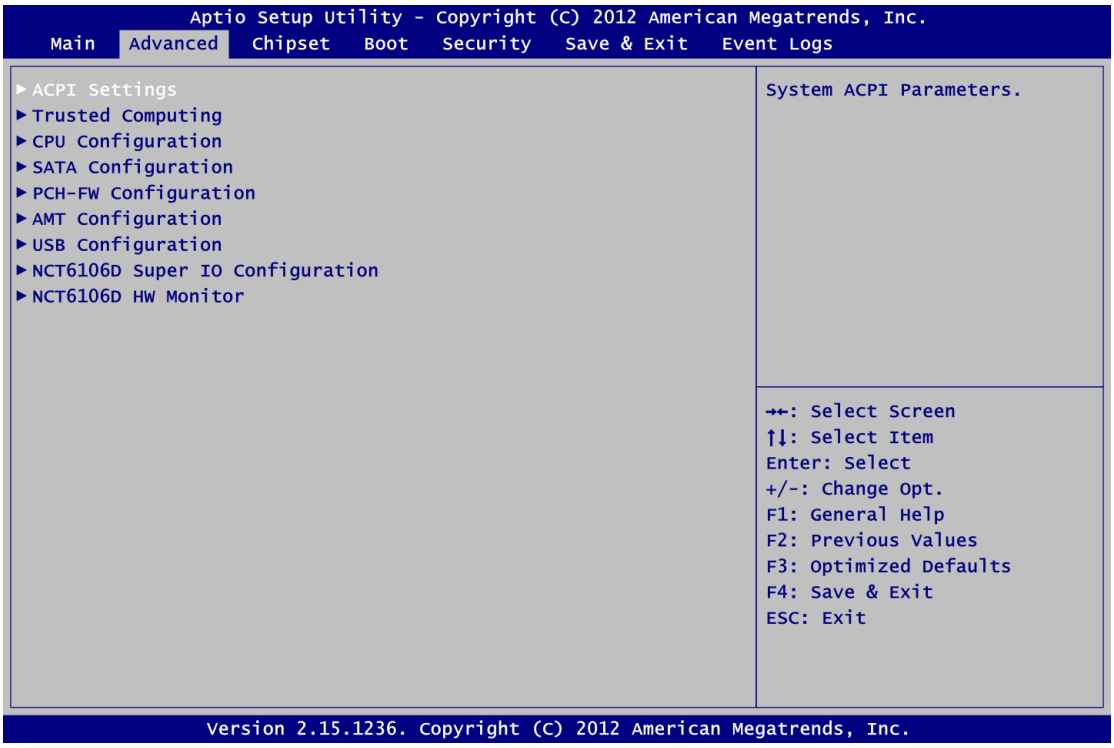
Access Level
Display the access level of current user.

5.4 Advanced Menu

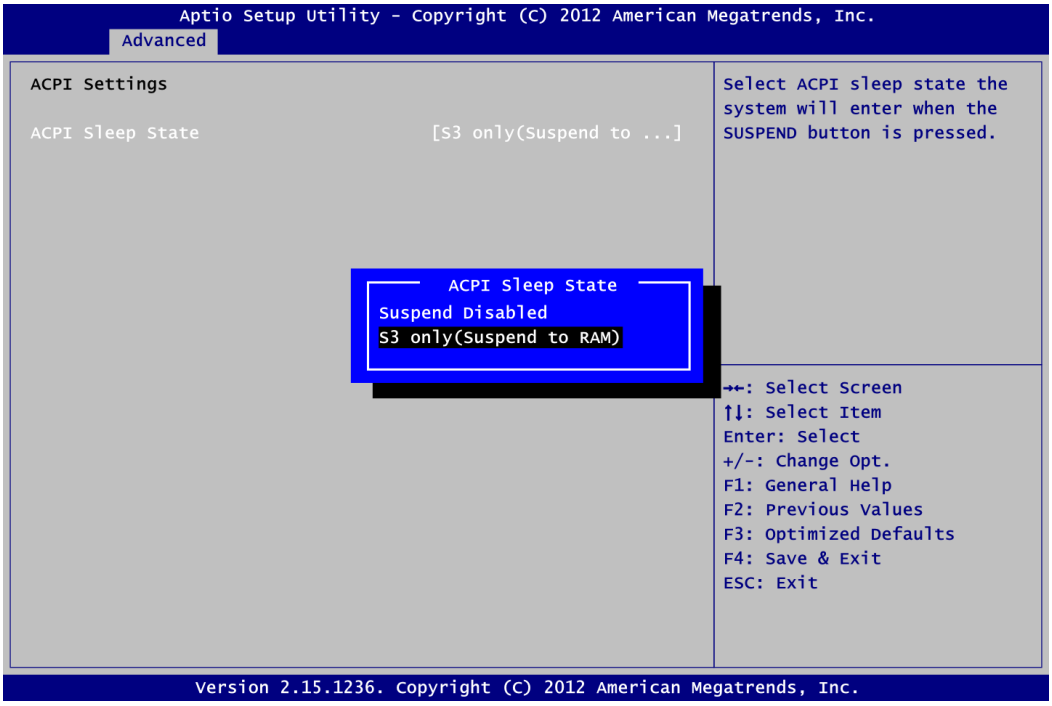
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ ACPI Settings
- ▶ Trusted Computing
- ▶ CPU Configuration
- ▶ SATA Configuration
- ▶ PCH-FW Configuration
- ▶ AMT Configuration
- ▶ USB Configuration
- ▶ NCT6106D Super IO Configuration
- ▶ NCT6106D HW Monitor

For items marked with "▶", please press <Enter> for more options.

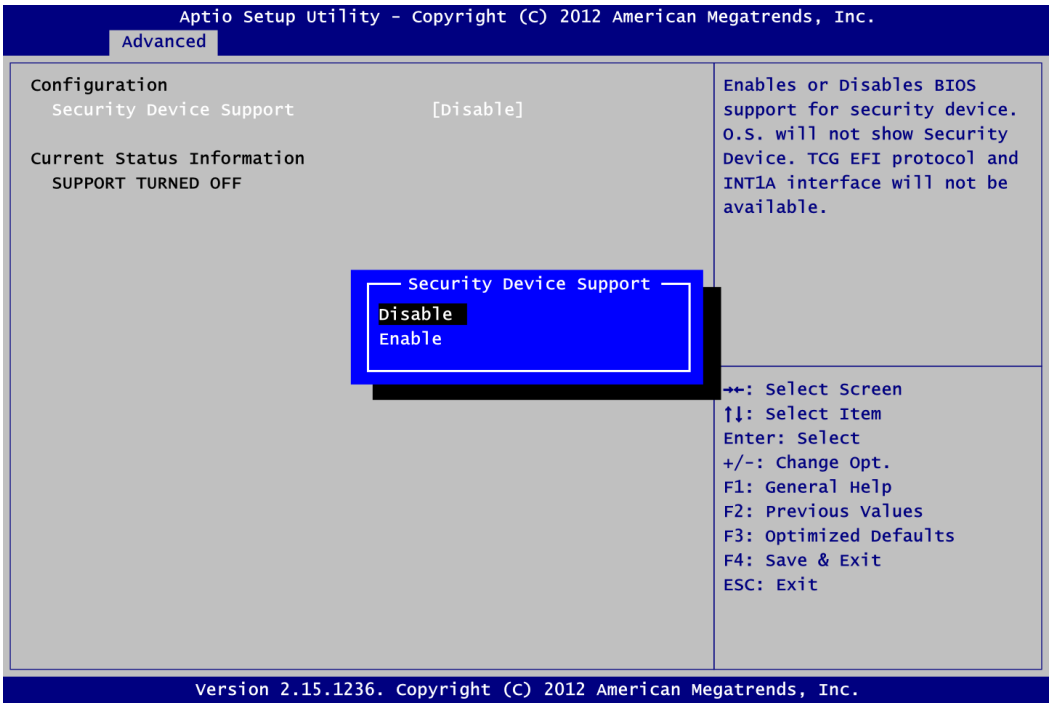


- **ACPI Settings**
  You can use this screen to select options for the ACPI configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



ACPI Sleep State
Select the ACPI sleep state the system will enter when the suspend button is pressed. Configuration options are Suspend Disabled and S3 only (Suspend to RAM).

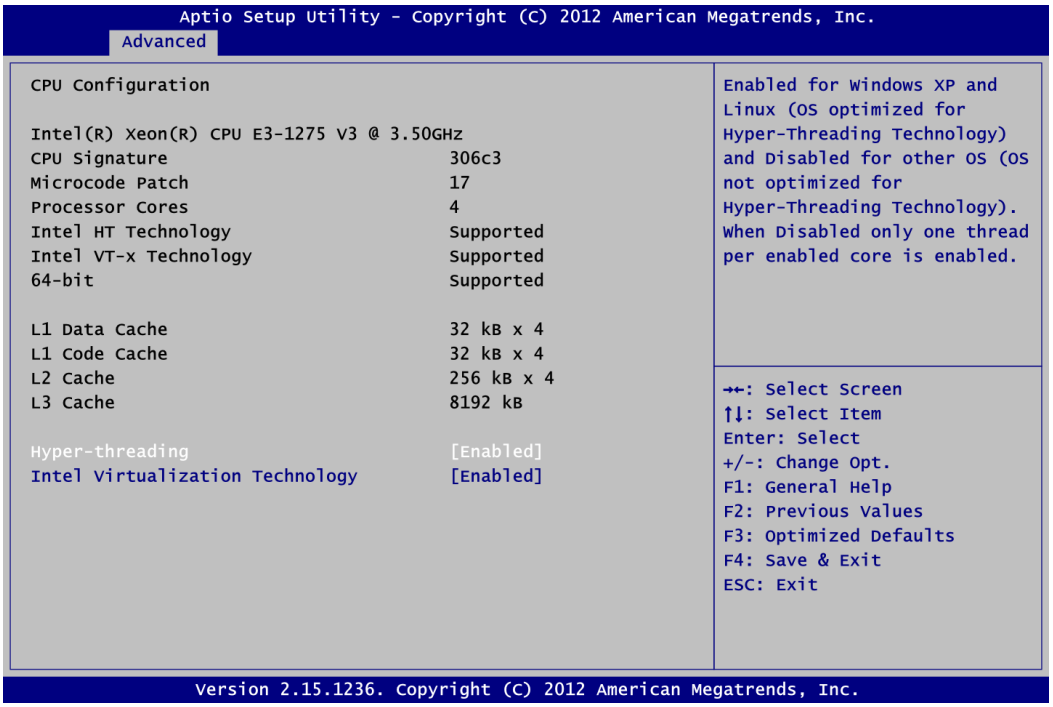
- **Trusted Computing**
  This screen provides function for specifying the TPM settings.



Security Device Support
Enable or disable BIOS support for security device. The default setting is Disable.

Current Status Information
Display current TPM status information.

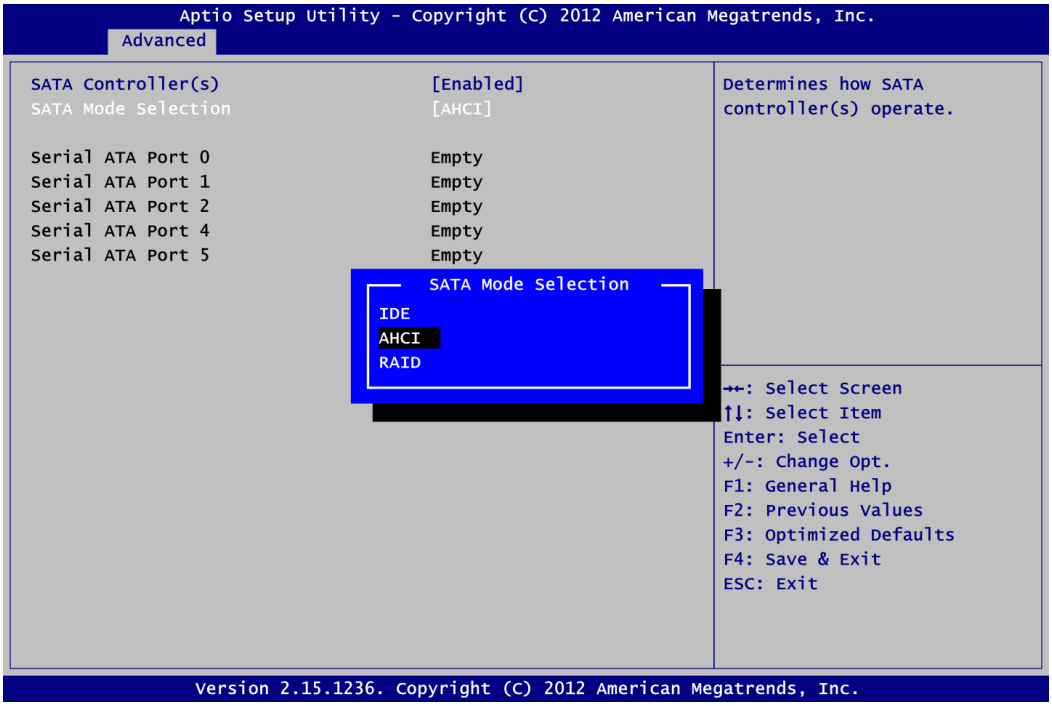
- **CPU Configuration**
  This screen shows the CPU information.



Hyper-threading
Enable or disable Hyper-Threading Technology, which makes a single physical processor perform multi-tasking function as two logical ones.

Intel Virtualization Technology
Allow a hardware platform to run multiple operating systems separately and simultaneously, enabling one system to virtually function as several systems.

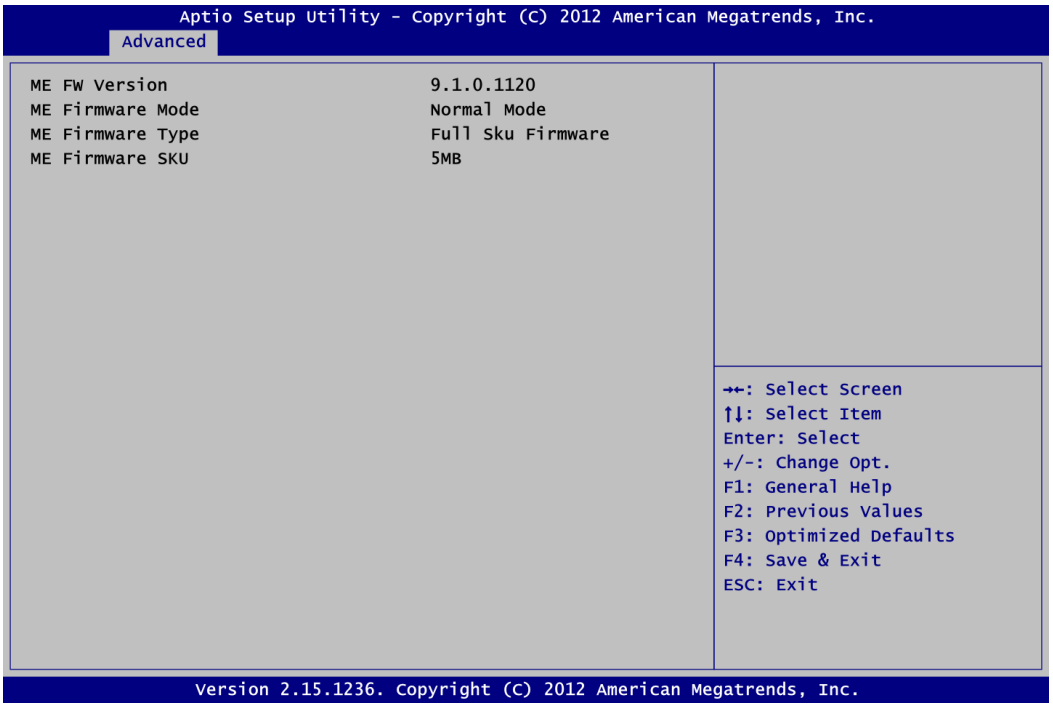
- **SATA Configuration**
  In this Configuration menu, you can see the currently installed hardware in the SATA ports. During system boot up, the BIOS automatically detects the presence of SATA devices.



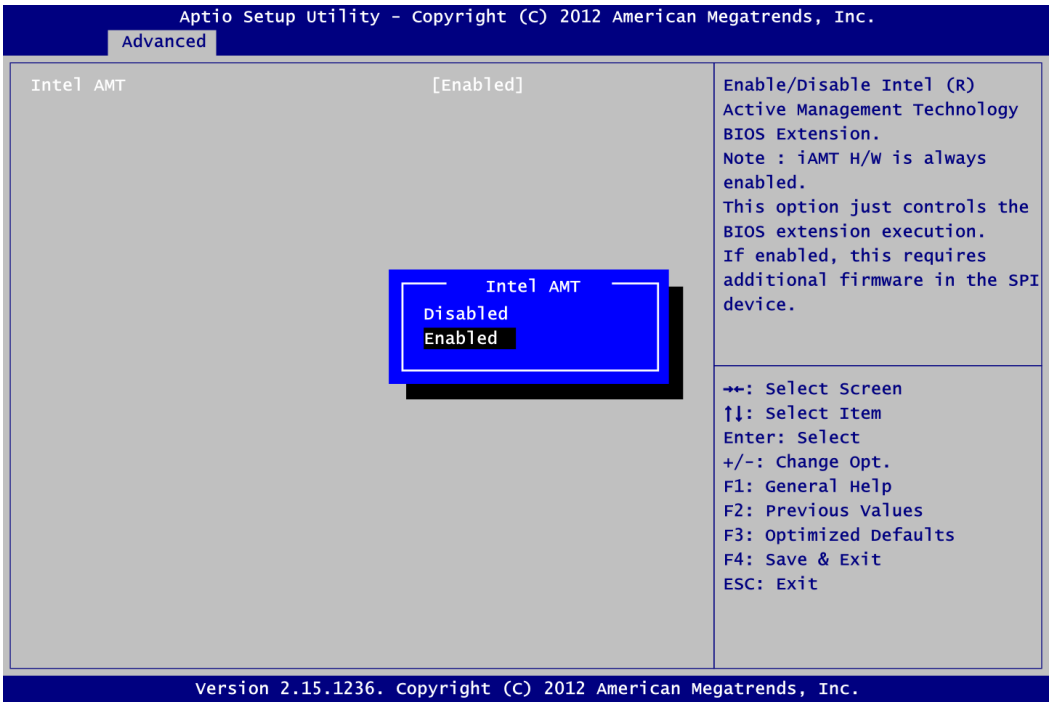
SATA Controller(s)
Use this item to enable or disable the SATA controller(s) feature.

SATA Mode Selection
Determine how SATA controller(s) operate. Operation mode options are IDE, AHCI and RAID Mode.

- **PCH-FW Configuration**
  This screen displays ME Firmware information.

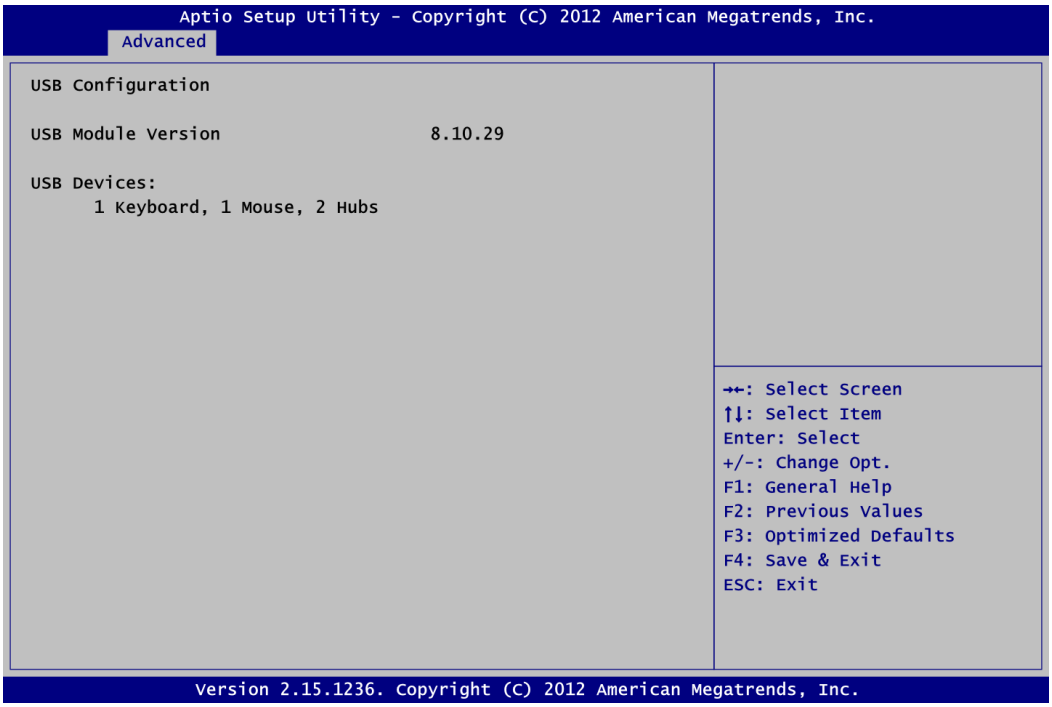


- **AMT Configuration**
  Use this screen to configure AMT parameters.



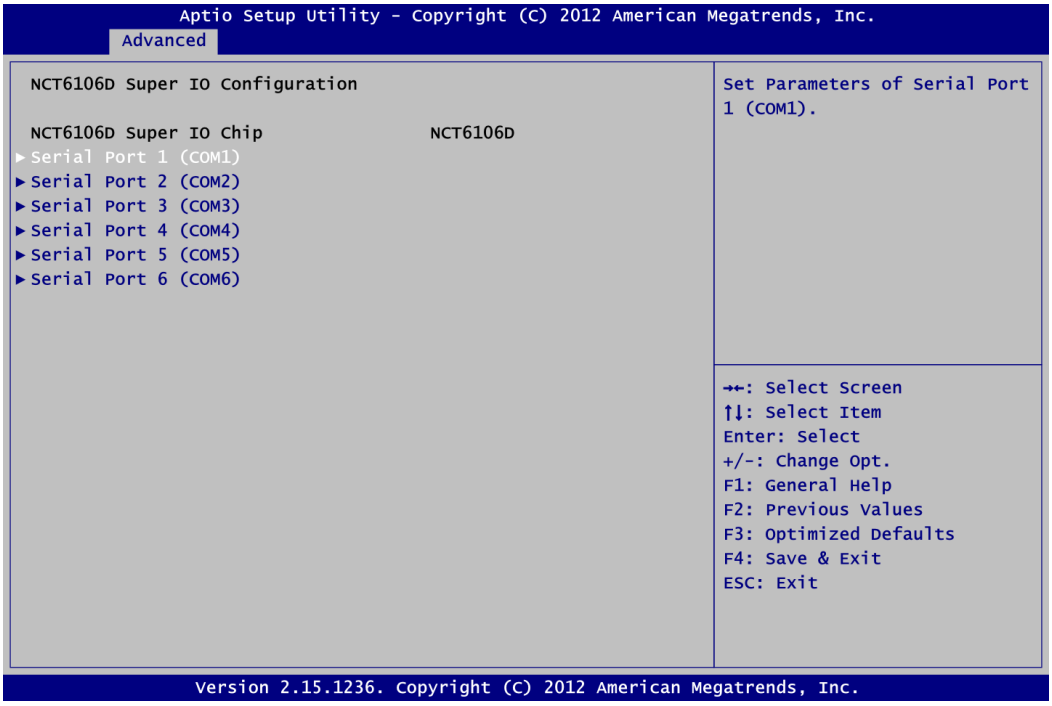
Intel AMT
Enable or disable Intel® Active Management Technology BIOS Extension. The default is Enabled.

- **USB Configuration**



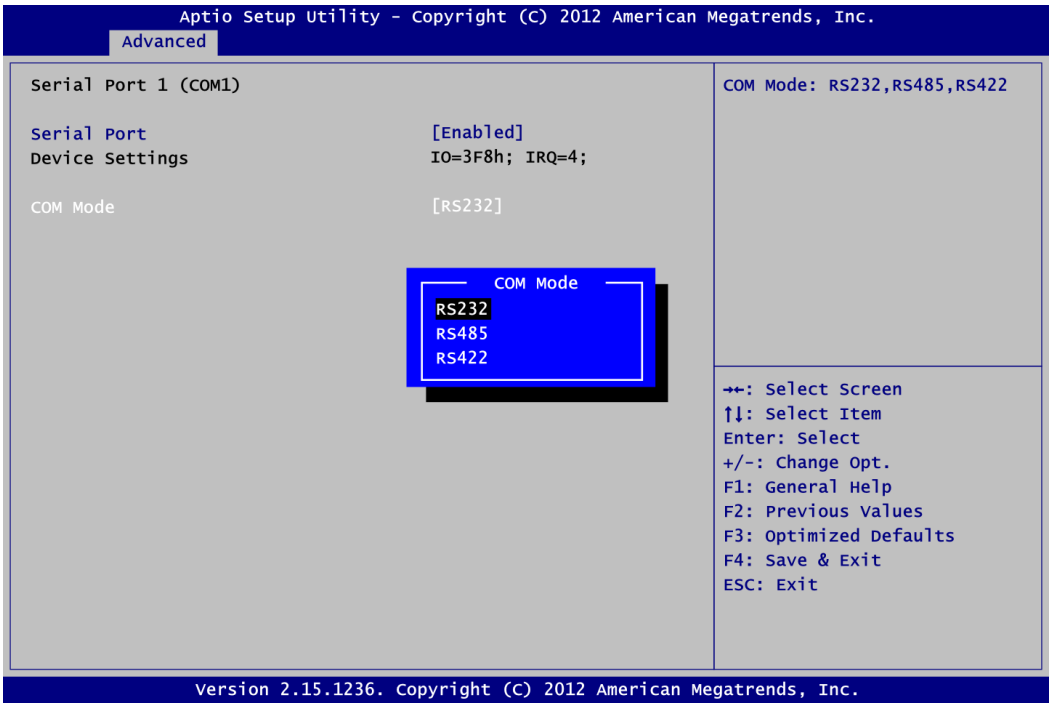
USB Devices
Display all detected USB devices.

- **NCT6106D Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "▶", please press <Enter> for more options.



Serial Port 1~6 (COM1~6)
Set parameters of serial port 1 to 6.

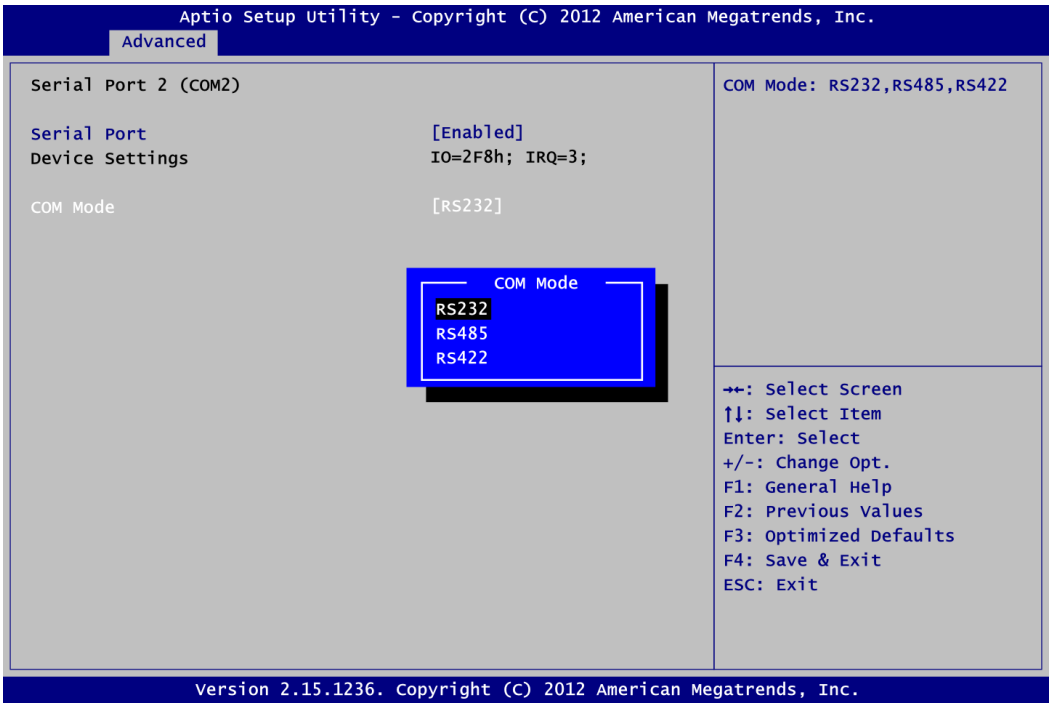
- **Serial Port 1 (COM1)**



Serial Port
Enable or disable serial port 1. The optimal setting for base I/O address is 3F8h and for interrupt request address is IRQ4.

COM Mode
Use this option to set RS-232/RS-485/RS-422 communication mode for serial port 1.

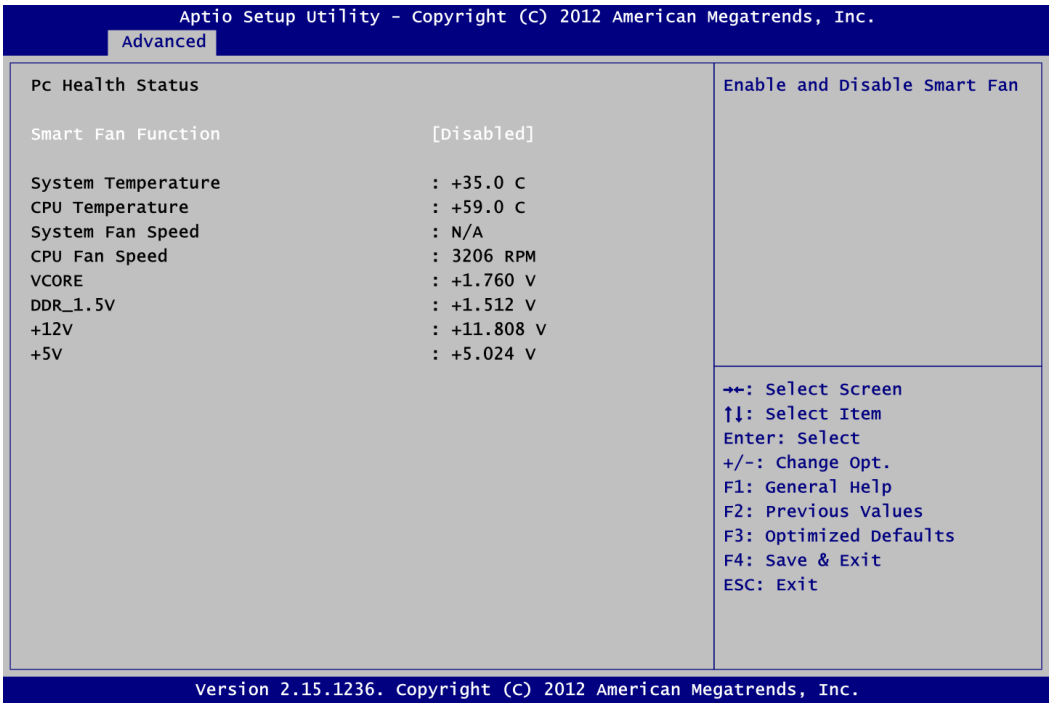
- **Serial Port 2 (COM2)**



Serial Port
Enable or disable serial port 2. The optimal setting for base I/O address is 2F8h and for interrupt request address is IRQ3.

COM Mode
Use this option to set RS-232/RS-485/RS-422 communication mode for serial port 2.

- **NCT6106D HW Monitor**
  This screen is for Smart Fan configuration and hardware health status monitoring.



This screen displays the temperature of system and CPU, cooling fan speed in RPM and system voltages (VCORE, DDR_1.5V, +12V and +5V).

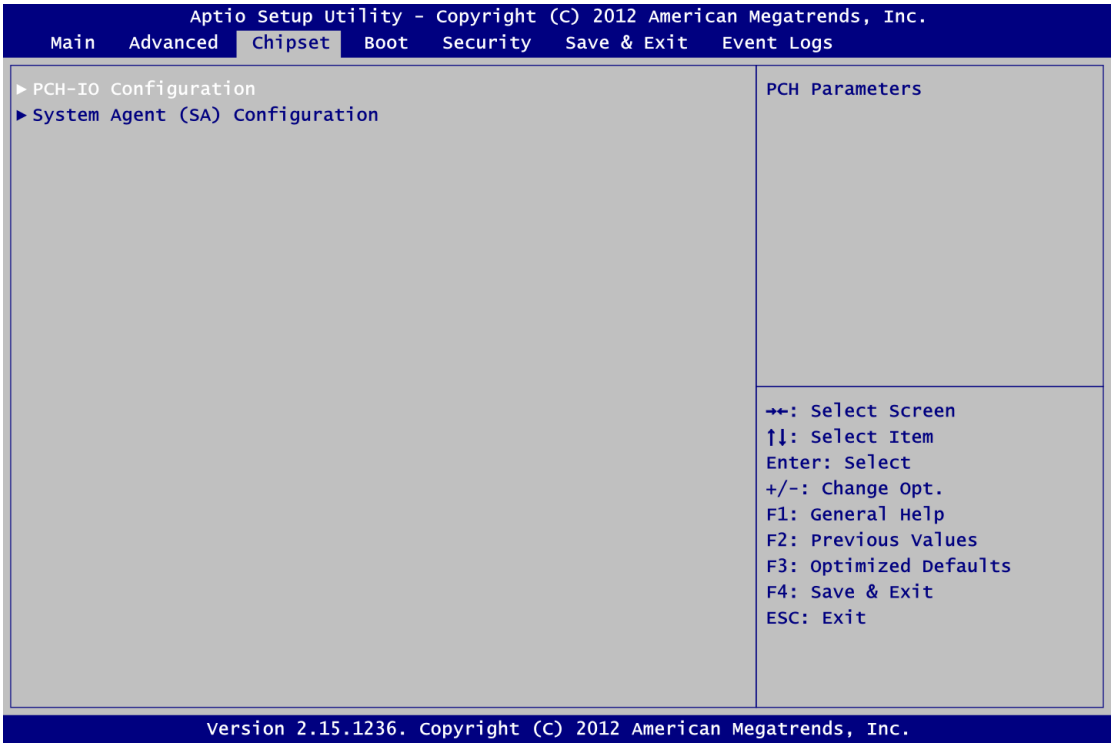
Smart Fan Function
Enable or disable Smart Fan function.

5.5 Chipset Menu

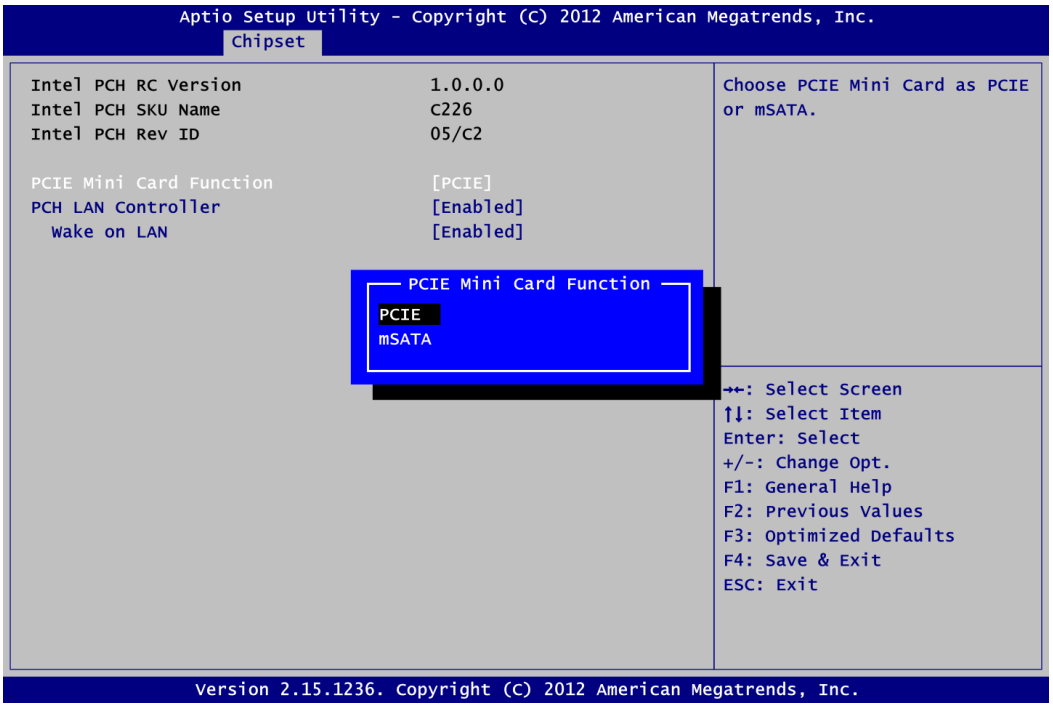
The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► PCH-IO Configuration
- ► System Agent (SA) Configuration

For items marked with "►", please press <Enter> for more options.



- **PCH-IO Configuration**
  This screen allows you to set PCH parameters.

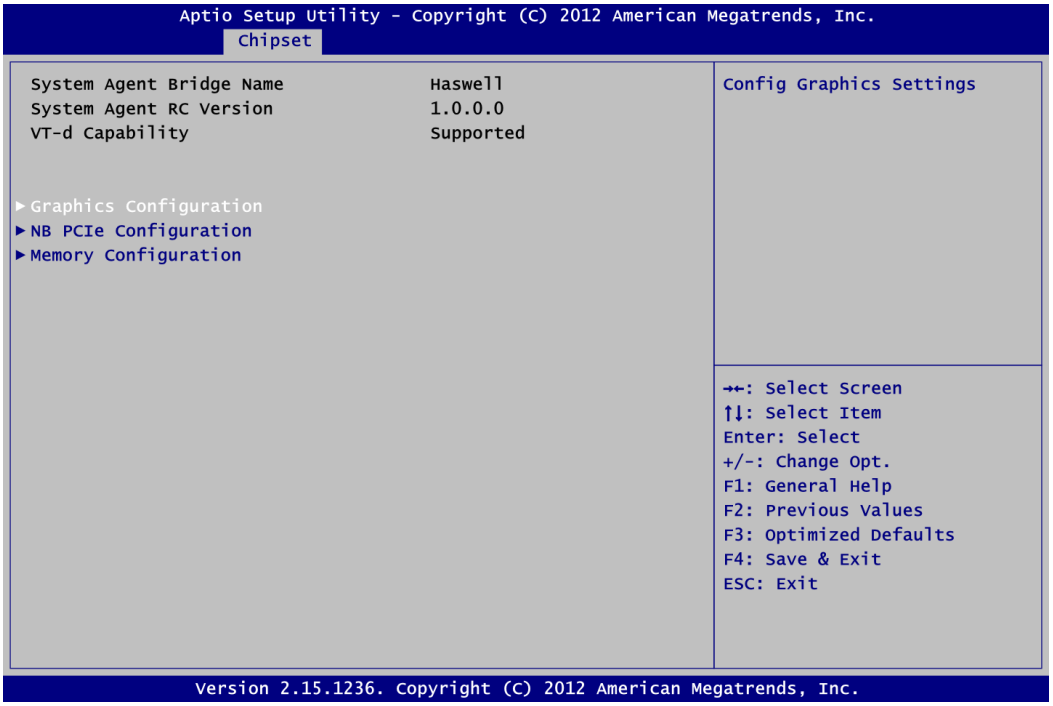


PCIE Mini Card Function
Set PCI-Express Mini Card to work as PCI-Express or mSATA.

PCH LAN Controller
Enable or disable PCH LAN controller.

Wake on LAN
Enable or disable Wake on LAN functionality.

- **System Agent (SA) Configuration**
  This screen shows System Agent version information and provides function for specifying related parameters.

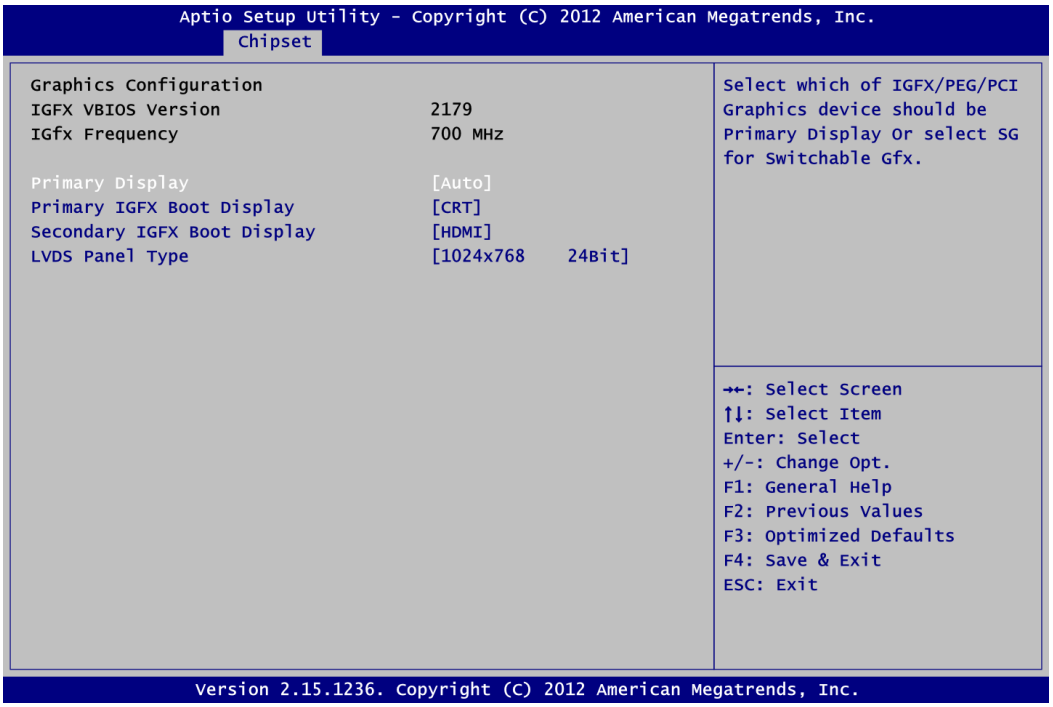


Graphics Configuration
Use this item to configure graphics controller.

NB PCIe Configuration
Use this item for NB PCI-Express configuration.

Memory Configuration
Use this item to refer to the information related to system memory.

- **Graphics Configuration**



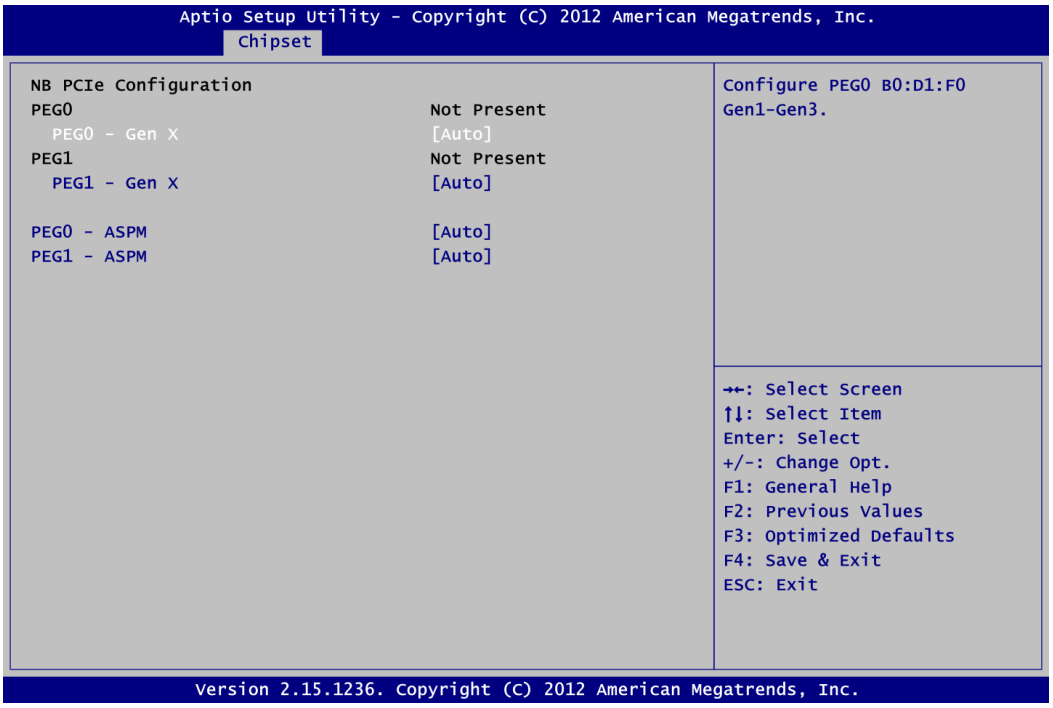
Primary Display
Select which of IGFX/PEG/PCI graphics device should be primary display.

Primary IGFX Boot Display
Select the display device which will be activated during POST (Power-On Self Test).

Secondary IGFX Boot Display
Use this option to select secondary display device.

LVDS Panel Type
Select LVDS panel resolution.

- **NB PCIe Configuration**

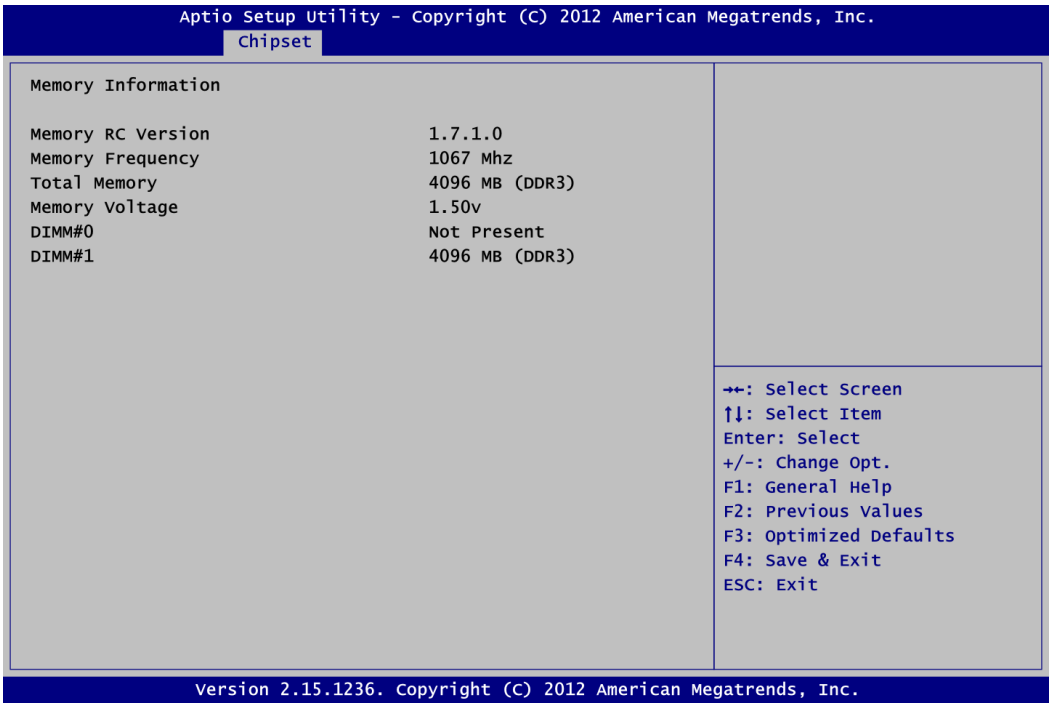


PEG0 – Gen X
Configure PEG0 B0:D1:F0 Gen1-Gen3.

PEG1 – Gen X
Configure PEG0 B0:D1:F1 Gen1-Gen3.

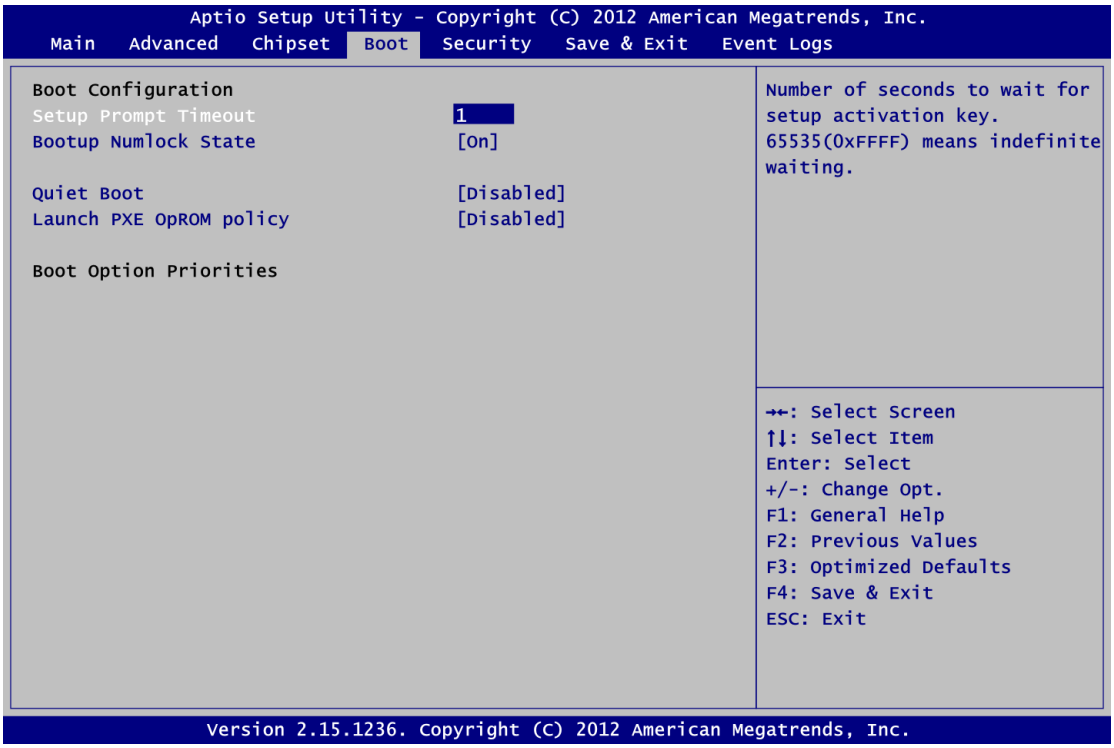
PEG0/1 - ASPM
Control ASPM support for the PEG0/1 device.

- **Memory Information**
  This screen shows the system memory information.



5.6 Boot Menu

The Boot menu allows users to change boot options of the system.



- **Setup Prompt Timeout**
  Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

- **Bootup NumLock State**
  Use this item to select the power-on state for the keyboard NumLock.

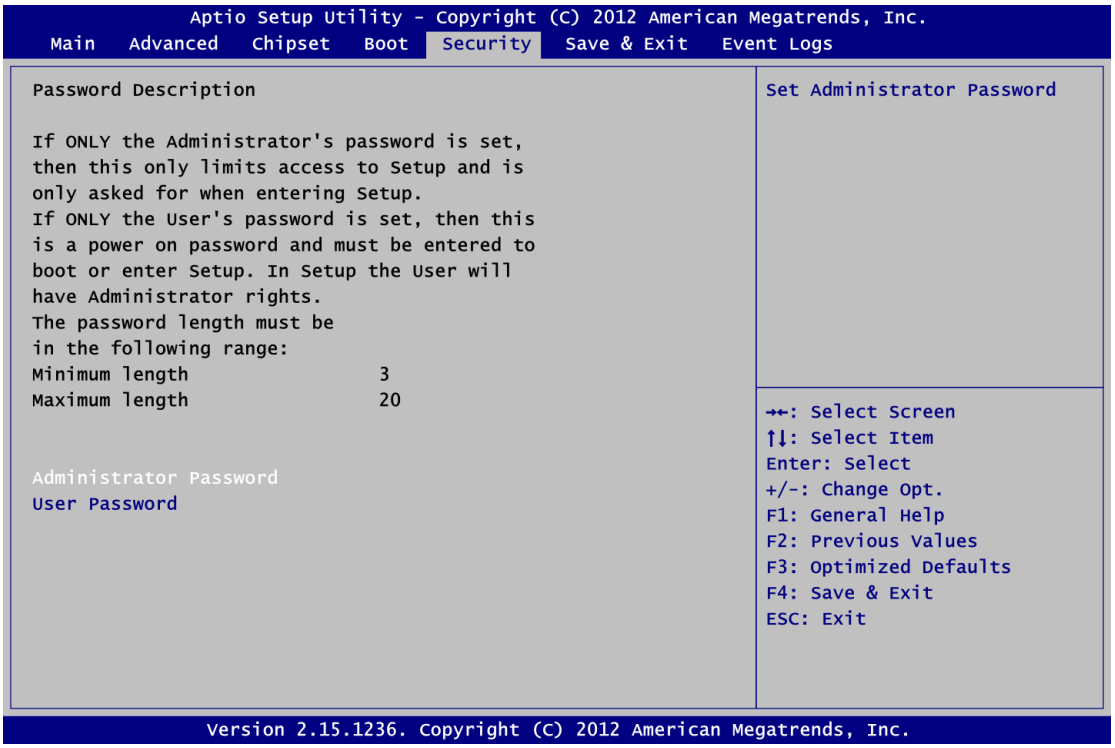
- **Quiet Boot**
  Select to display either POST output messages or a splash screen during boot-up.

- **Launch PXE OpROM policy**
  Control the execution of UEFI and Legacy PXE OpROM.

- **Boot Option Priorities**
  These are settings for boot priority. Specify the boot device priority sequence from the available devices.

5.7 Security Menu

The Security menu allows users to change the security settings for the system.

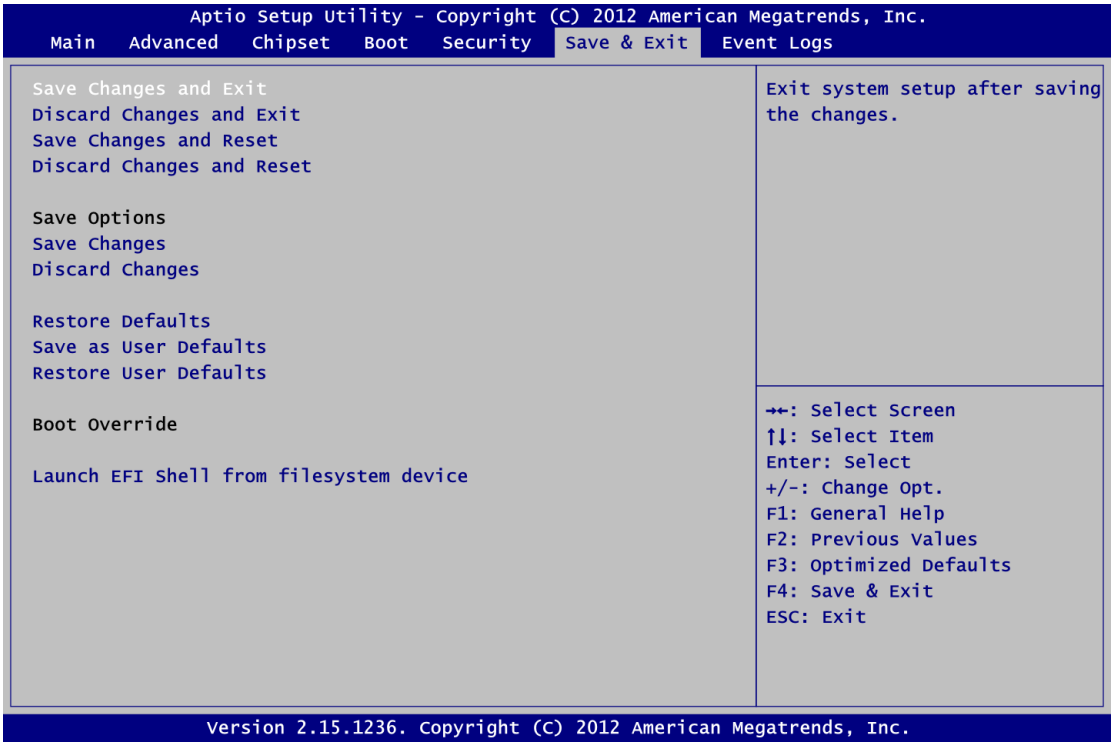


- **Administrator Password**
  This item indicates whether an administrator password has been set (installed or uninstalled).

- **User Password**
  This item indicates whether an user password has been set (installed or uninstalled).

5.8 Save & Exit Menu

The Save & Exit menu allows users to load your system configuration with optimal or fail-safe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and return to Main Menu. Select Save Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

- **Save Changes and Reset**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

- **Discard Changes and Reset**
  Select this option to quit Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to discard changes and reset.

- **Save Changes**
  When you have completed the system configuration changes, select this option to save changes. Select Save Changes from the Save & Exit menu and press <Enter>. Select Yes to save changes.

- **Discard Changes**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select Discard Changes from the Save & Exit menu and press <Enter>. Select Yes to discard changes.

- **Restore Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

- **Save as User Defaults**
  Select this option to save system configuration changes done so far as User Defaults. Select Save as User Defaults from the Save & Exit menu and press <Enter>.

- **Restore User Defaults**
  It automatically sets all Setup options to a complete set of User Defaults when you select this option. Select Restore User Defaults from the Save & Exit menu and press <Enter>.

- **Boot Override**
  Select a drive to immediately boot that device regardless of the current boot order.

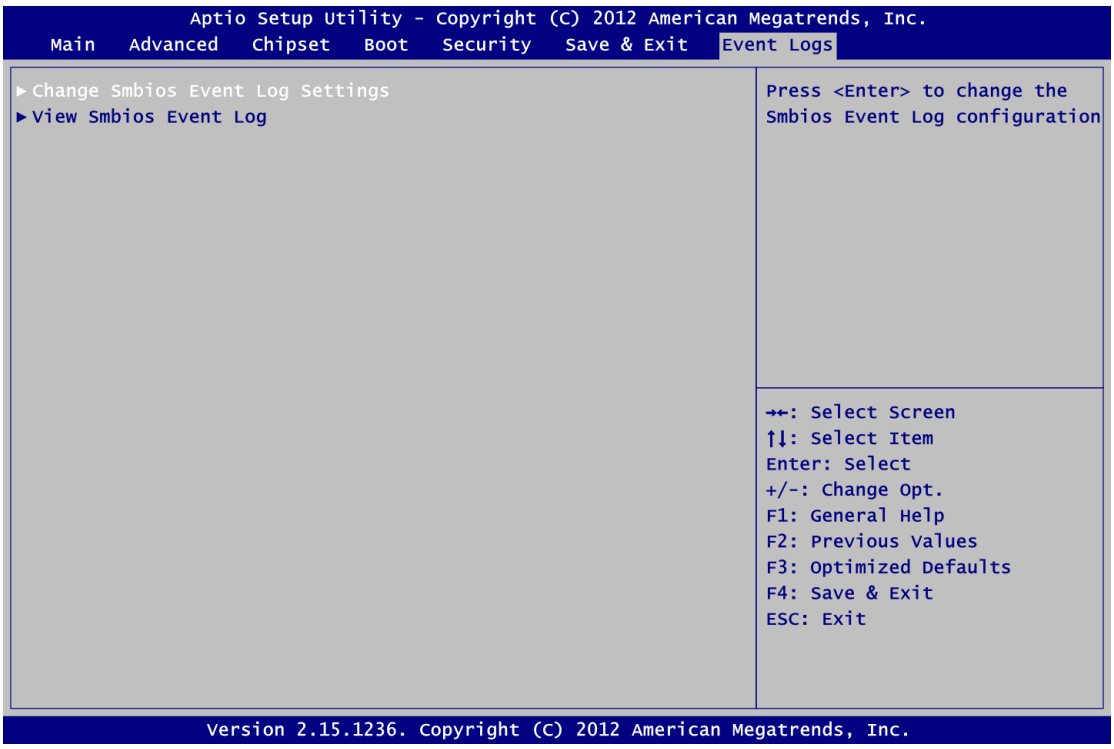
- **Launch EFI Shell from filesystem device**
  Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices.

5.9 Event Logs

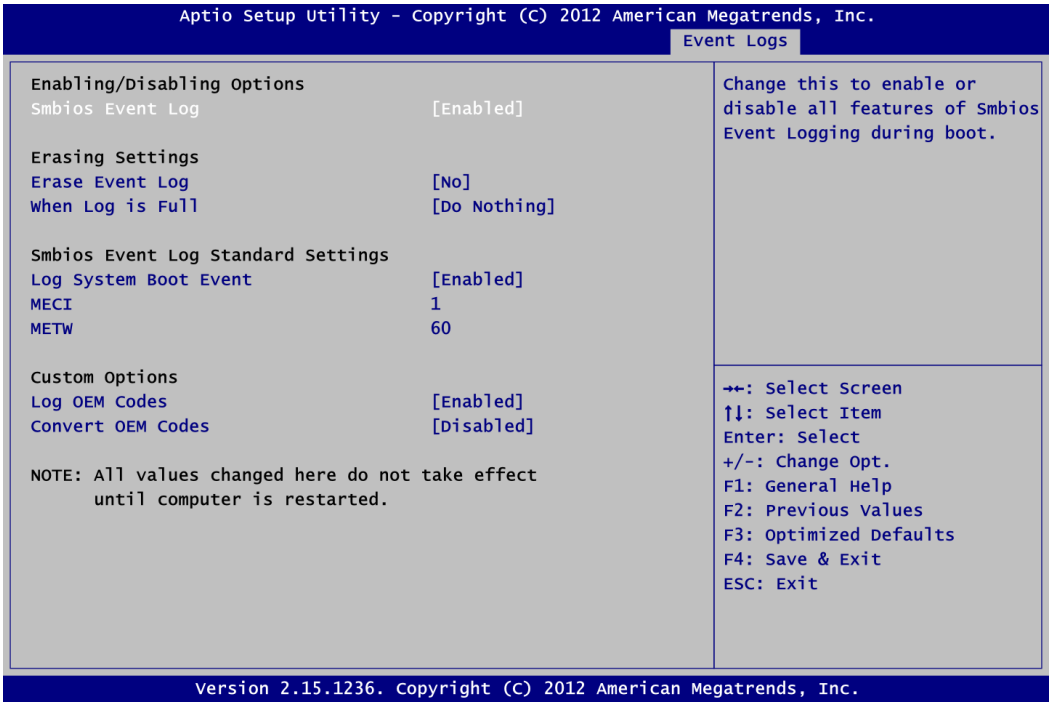
The Even Logs menu allows users to change the advanced Event Log settings and view Event Log. You can select any of the items in the left frame of the screen to go to the sub menus:

- ► Change Smbios Event Log Settings
- ► View Smbios Event Log

For items marked with "►", please press <Enter> for more options.



- **Change Smbios Event Log Settings**
  This screen allows you to change Smbios Event Log settings.



Smbios Event Log
Enable or disable all features of Smbios Event Logging during boot.

Erase Event Log
Choose options for erasing Smbios Event Log. Erasing is done prior to any logging activation during reset. Configuration options are No, Yes Next reset and Yes Every reset.

When Log is Full
Choose options for reactions to a full Smbios Event Log. Configuration options are Do Nothing and Erase Immediately.

Log System Boot Event
Enable and disable Log System Boot Event.

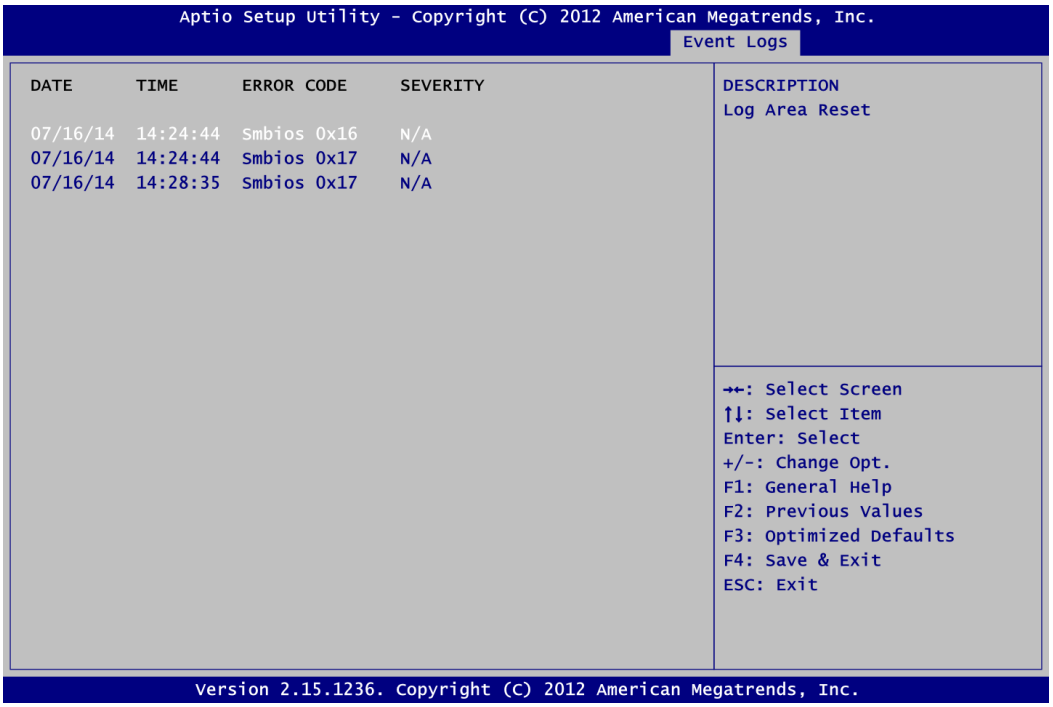
MECI (Mutiple Event Count Increment)
The number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry is updated, specified as a numeric value in the range 1 to 33.

METW (Mutiple Event Time Window)
The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99 minutes.

Log OEM Codes
Enable or disable the logging of EFI Status Codes as OEM Codes (if not already converted to legacy).

Convert OEM Codes
Enable or disable the converting of EFI Status Codes to Standard Smbios Types (not all may be translated).

- **View Smbios Event Log**
  Press <Enter> to view the Smbios Event Log records.



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Appendix A
Watchdog Timer

About Watchdog Timer

After the system stops working for a while, it can be auto-reset by the watchdog timer. The integrated watchdog timer can be set up in the system reset mode by program.

How to Use Watchdog Timer

Start
↓
Un-Lock WDT:
O 2E 87 ; Un-lock super I/O
O 2E 87 ; Un-lock super I/O
↓
Select Logic device:
O 2E 07
O 2F 08
↓
Set Second or Minute:
O 2E F0
O 2F N ; N=00 or 08 (See *Note* below)
↓
Set base timer:
O 2E F1
O 2F M ; M=00,01,02,…FF(Hex) ,Value=0 to 255
↓
WDT counting re-set timer:
O 2E F1
O 2F M ; M=00,01,02,…FF (See *Note* below)
↓
IF No re-set timer:
; WDT time-out, generate RESET

;IF to disable WDT:
O 2E 30
O 2F 00 ; Can be disabled at any time

- Timeout Value Range
  - 1 to 255
  - Minute / Second

Note:

*If **N**=00h, the time base is set to second.*
***M** = time value*
00h: Time-out Disable
01h: Time-out occurs after 1 second
02h: Time-out occurs after 2 seconds
03h: Time-out occurs after 3 seconds
.
.
FFh: Time-out occurs after 255 seconds

*If **N**=08h, the time base is set to minute.*
***M** = time value*
00h: Time-out Disable
01h: Time-out occurs after 1 minute
02h: Time-out occurs after 2 minutes
03h: Time-out occurs after 3 minutes
.
.
FFh: Time-out occurs after 255 minutes

Appendix B
Digital I/O

Digital I/O Software Programming

- I2C to GPIO PCA9554PW GPIO[3:0] is Output, GPIO[7:4] is Input.
- I2C address: 0b0100100x.
- IOBASE: 0xF040
- Registers:

Command byte

Command	Protocol	Function
0	Read byte	Input port register
1	Read/write byte	Output port register
2	Read/write byte	Polarity inversion register
3	Read/write byte	Configuration register

The command byte is the first byte to follow the address byte during a write transmission. It is used as a pointer to determine which of the following registers will be written or read.

Register 0: Input port register.
This register is a read-only port. It reflects the incoming logic levels of the pins, regardless of whether the pin is defined as an input or an output by Register 3. Writes to this register have no effect.

The default 'X' is determined by the externally applied logic level, normally '1' when no external signal externally applied because of the internal pull-up resistors.

Bit	Symbol	Access	Value	Description
7	I7	Read only	X	Determined by externally applied logic level.
6	I6	Read only	X	
5	I5	Read only	X	
4	I4	Read only	X	
3	I3	Read only	X	
2	I2	Read only	X	
1	I1	Read only	X	
0	I0	Read only	X	

Register 1: Output port register.
This register reflects the outgoing logic levels of the pins defined as outputs by Register 3. Bit values in this register have no effect on pins defined as inputs. Reads from this register return the value that is in the flip-flop controlling the output selection, not the actual pin value.

Bit	Symbol	Access	Value	Description
7	O7	R	1*	Reflects outgoing logic levels of pins defined as outputs by Register 3.
6	O6	R	1*	
5	O5	R	1*	
4	O4	R	1*	
3	O3	R	1*	
2	O2	R	1*	
1	O1	R	1*	
0	O0	R	1*	

* : Default value

Register 3: Configuration register.
This register configures the directions of the I/O pins. If a bit in this register is set, the corresponding port pin is enabled as an input with high-impedance output driver. If a bit in this register is cleared, the corresponding port pin is enabled as an output. At reset, the I/Os are configured as inputs with a weak pull-up to V_{DD}.

Bit	Symbol	Access	Value	Description
7	C7	R/W	1*	Configure the directions of the I/O pins. 0 = Corresponding port pin enabled as an output. 1 = Corresponding port pin configured as input (default value).
6	C6	R/W	1*	
5	C5	R/W	1*	
4	C4	R/W	1*	
3	C3	R/W	1*	
2	C2	R/W	1*	
1	C1	R/W	1*	
0	C0	R/W	1*	

* : Default value

Appendix C
Configuring SATA for RAID

Configuring SATA Hard Drive(s) for RAID Function

Before you begin the SATA configuration, please prepare:

- Two SATA hard drives (to ensure optimal performance, it is recommended that you use two hard drives with identical model and capacity). If you do not want to create RAID with the SATA controller, you may prepare only one hard drive.

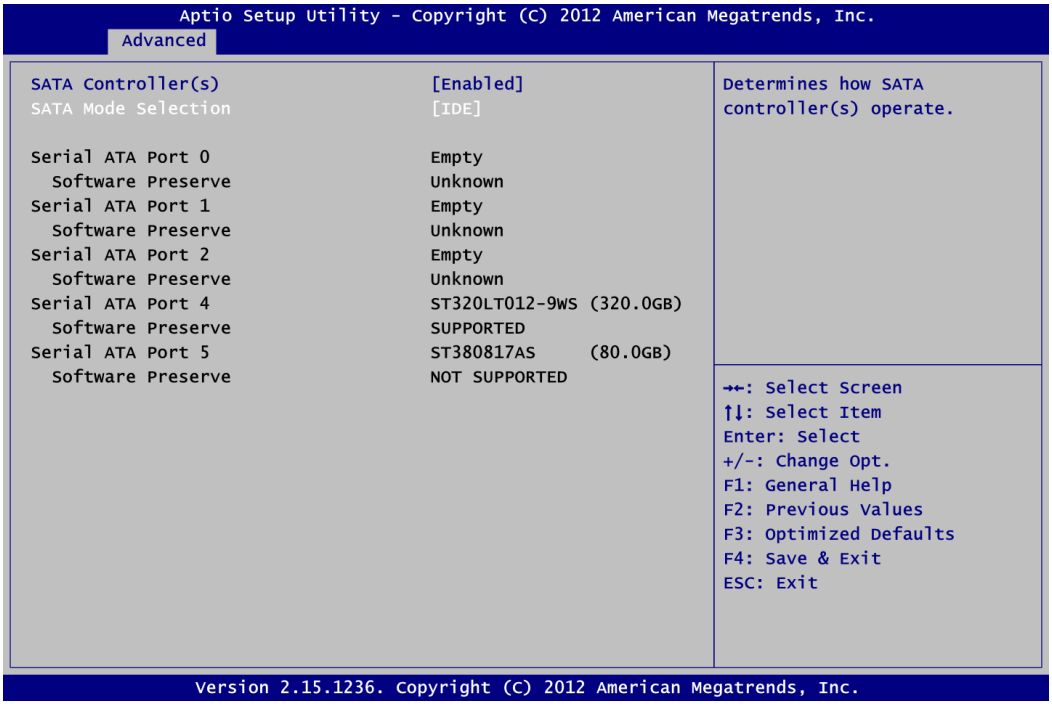
Please follow up the steps below to configure SATA hard drive(s):

1. Install SATA hard drive(s) in your system.
2. Enter the BIOS Setup to configure SATA controller mode and boot sequence.
3. Configure RAID by the RAID BIOS.

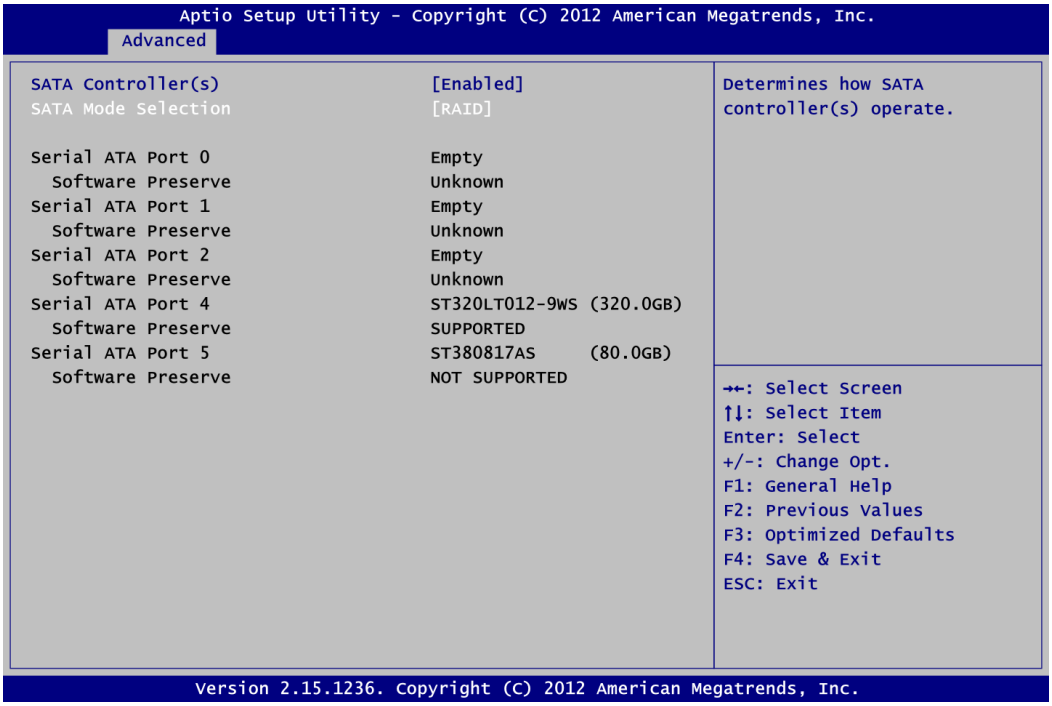
1. Installing SATA hard drive(s) in your system.
Connect one end of the SATA signal cable to the rear of the SATA hard drive, and the other end to available SATA port(s) on the board. Then, connect the power connector of power supply to the hard drive.

2. Configuring SATA controller mode and boot sequence by the BIOS Setup.
You have to make sure whether the SATA controller is configured correctly by system BIOS Setup and set up BIOS boot sequence for the SATA hard drive(s).

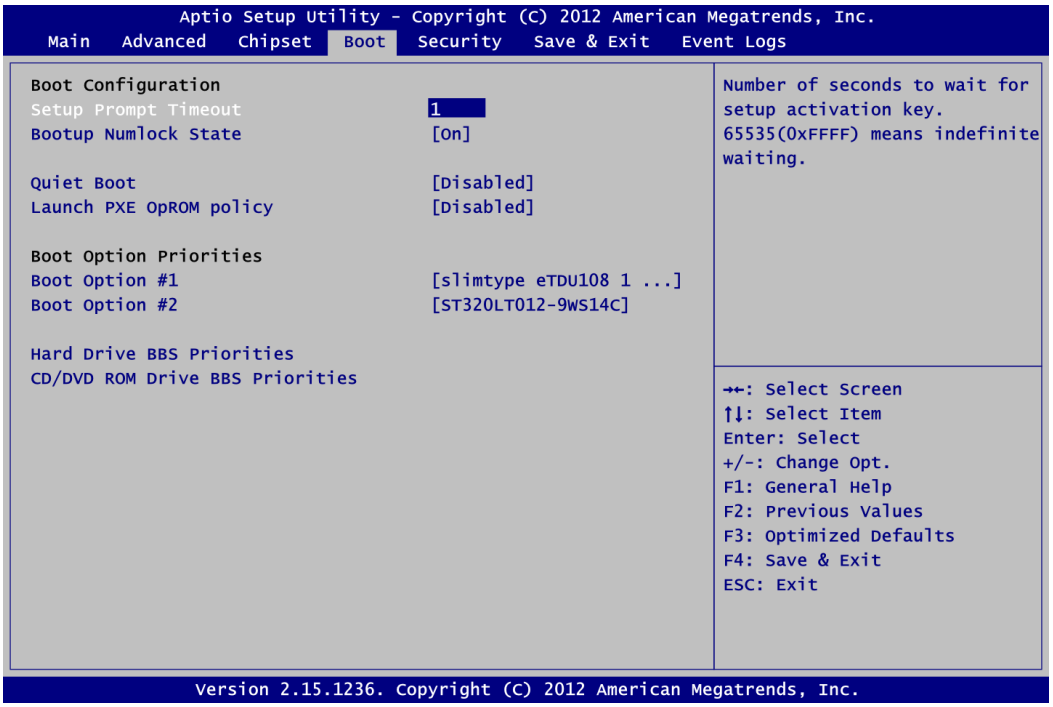
2.1. Turn on your system, and then press the <Del> button to enter BIOS Setup during running POST (Power-On Self Test). If you want to create RAID, just go to the Advanced Settings menu/SATA Configuration, select the “SATA Mode Selection”, and press <Enter> for more options.



A list of options appears, please select “RAID”.



2.2. Set DVD-ROM for First Boot Option under the Boot Settings menu to boot DVD-ROM after system restarts.

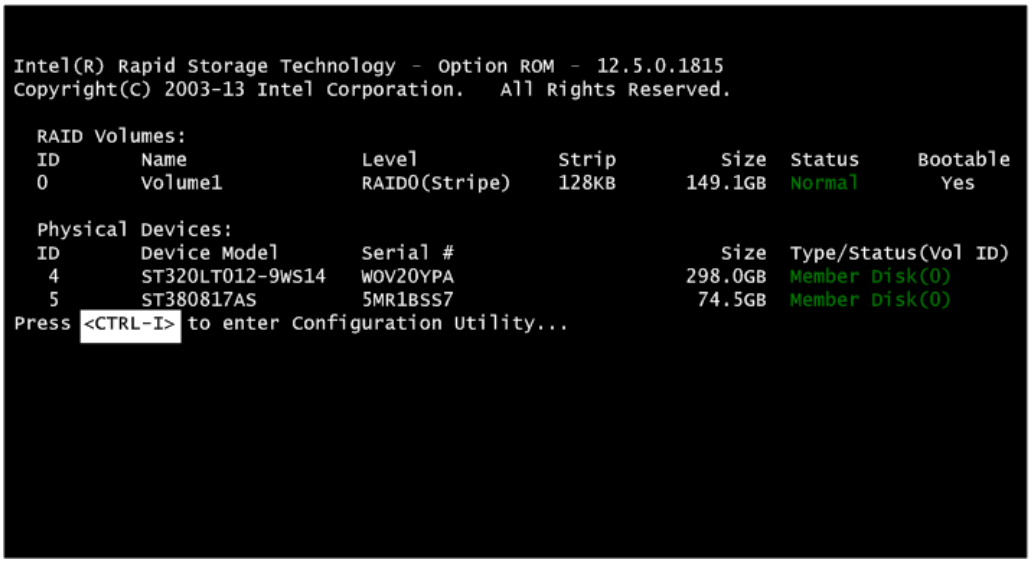


2.3. Save and exit the BIOS Setup.

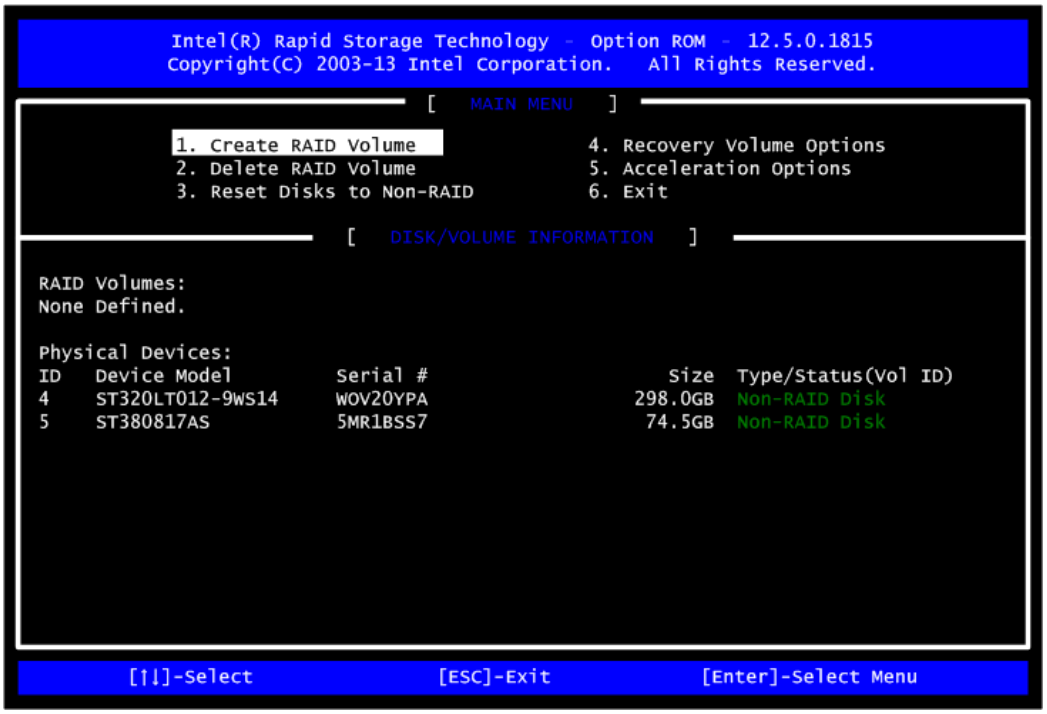
3. Configuring RAID by the RAID BIOS.

Enter the RAID BIOS setup utility to configure a RAID array. Skip this step and proceed if you do not want to create a RAID.

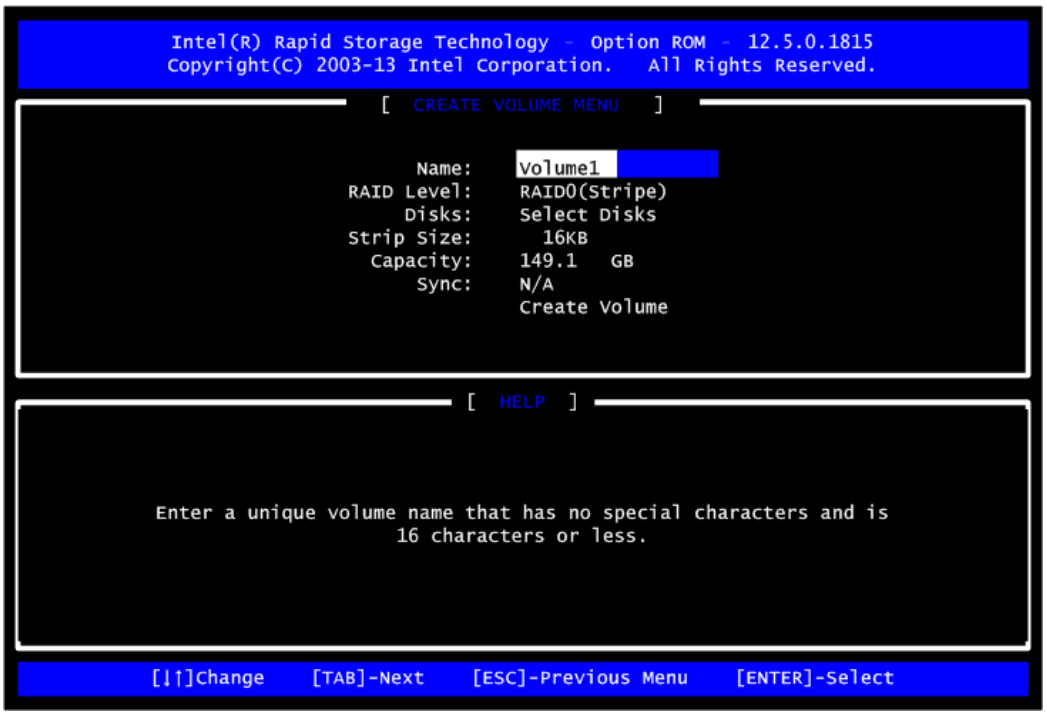
3.1. After the POST memory testing and before the operating system booting, a message "Press <Ctrl-I> to enter Configuration Utility" shows up, accordingly, press <Ctrl + I> to enter the RAID BIOS setup utility.



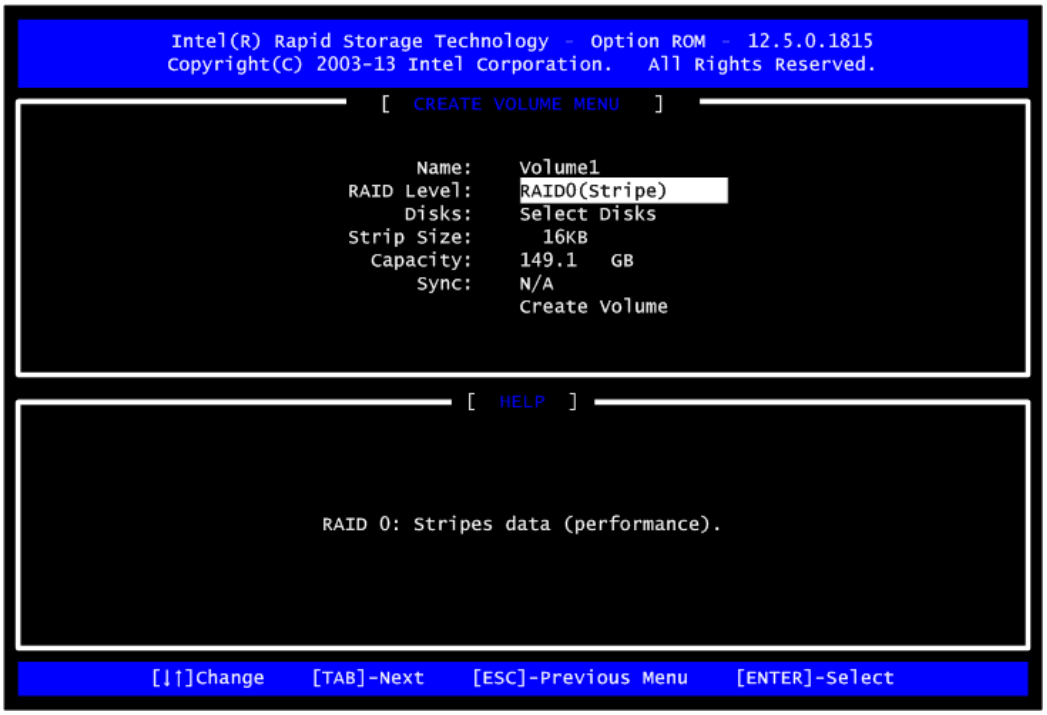
3.2. After you press <Ctrl + I>, the Create RAID Volume screen will appear. If you want to create a RAID array, select the Create RAID Volume option in the Main Menu and press <Enter>.



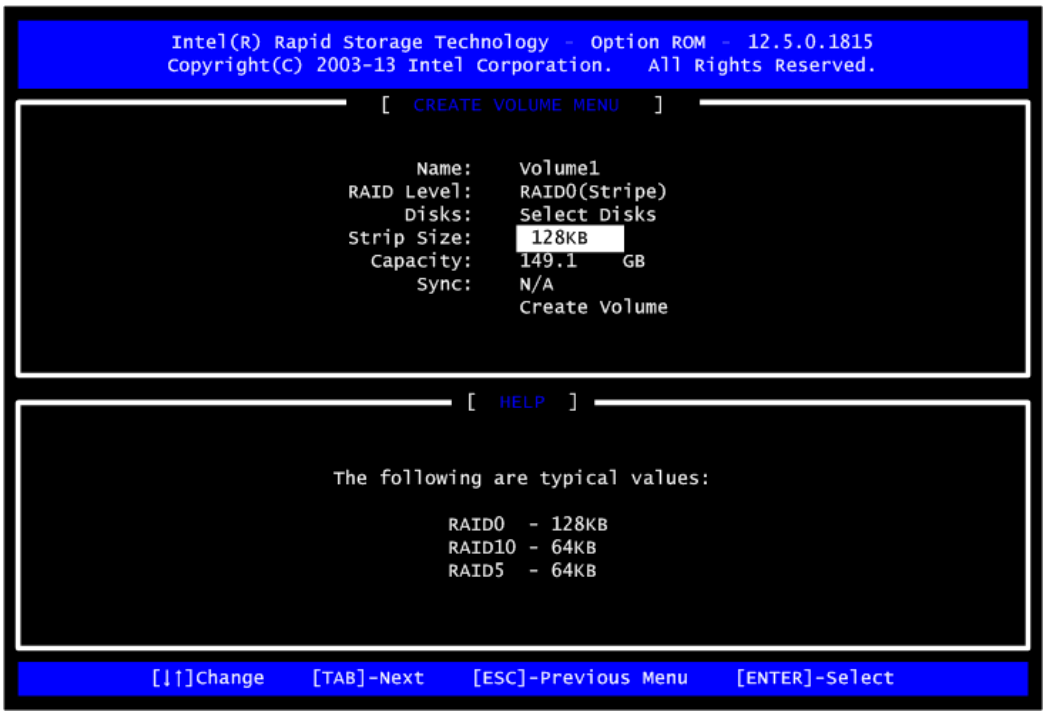
3.3. After entering the Create Volume Menu screen, you can type the disk array name with 1~16 letters (letters cannot be special characters) in the item “Name”.



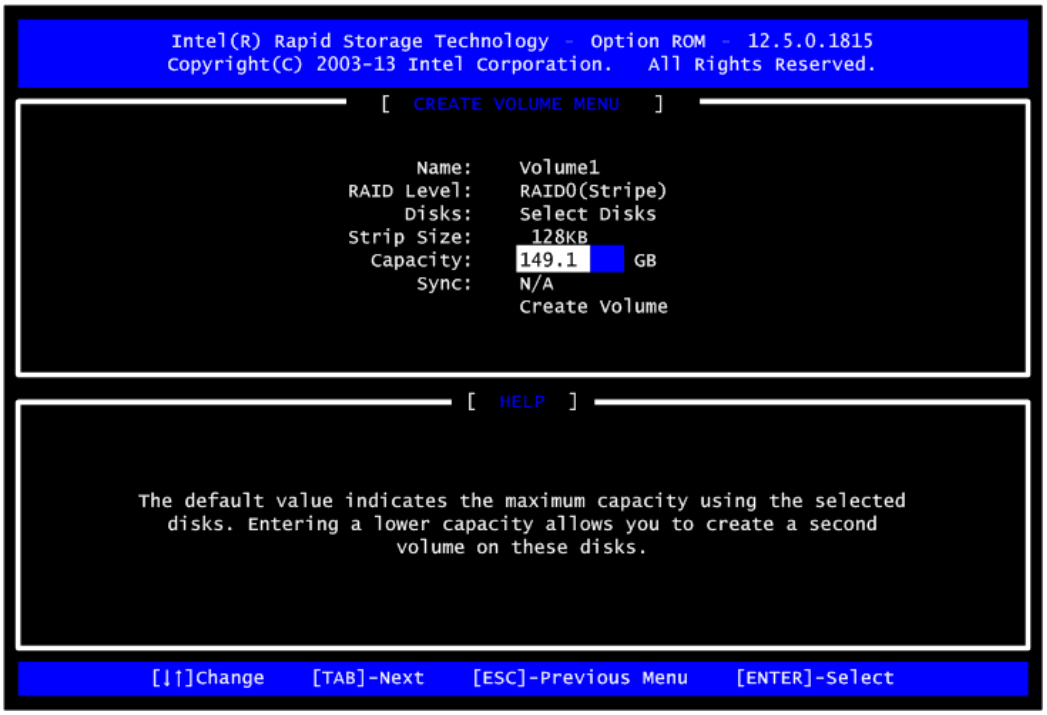
3.4. When finished, press <Enter> to select a RAID level. There are three RAID levels: RAID0, RAID1 and RAID5 and RAID10. Select a RAID level and press <Enter>.



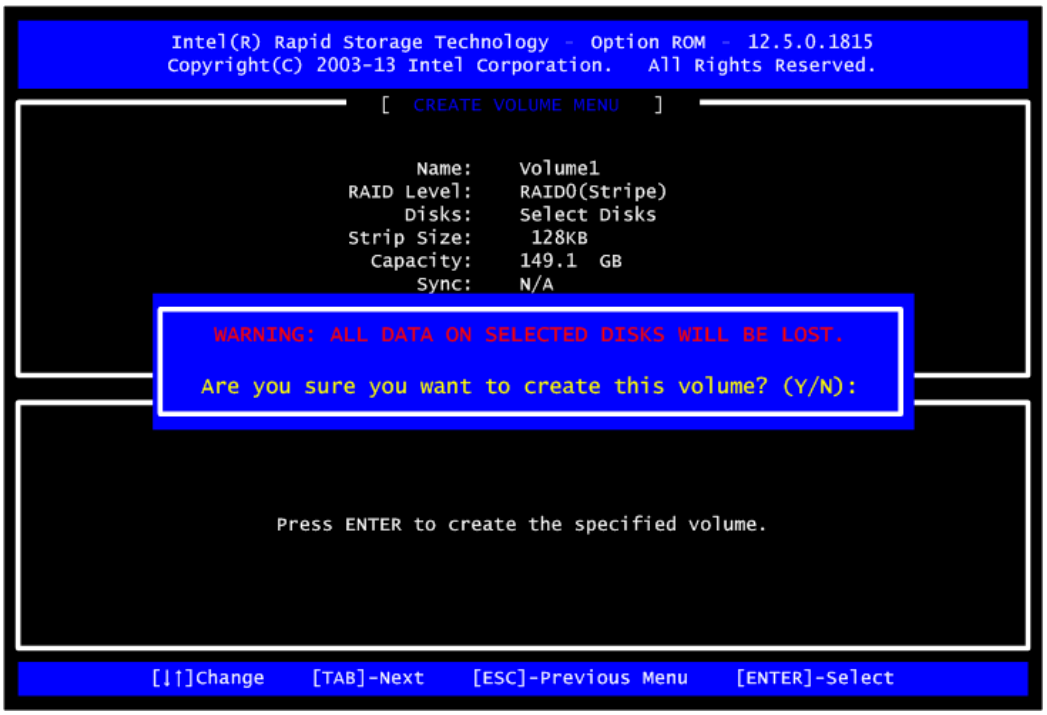
3.5. Set the stripe block size. The KB is the standard unit of stripe block size. The stripe block size can be 4KB to 128KB. After the setting, press <Enter> for the array capacity.



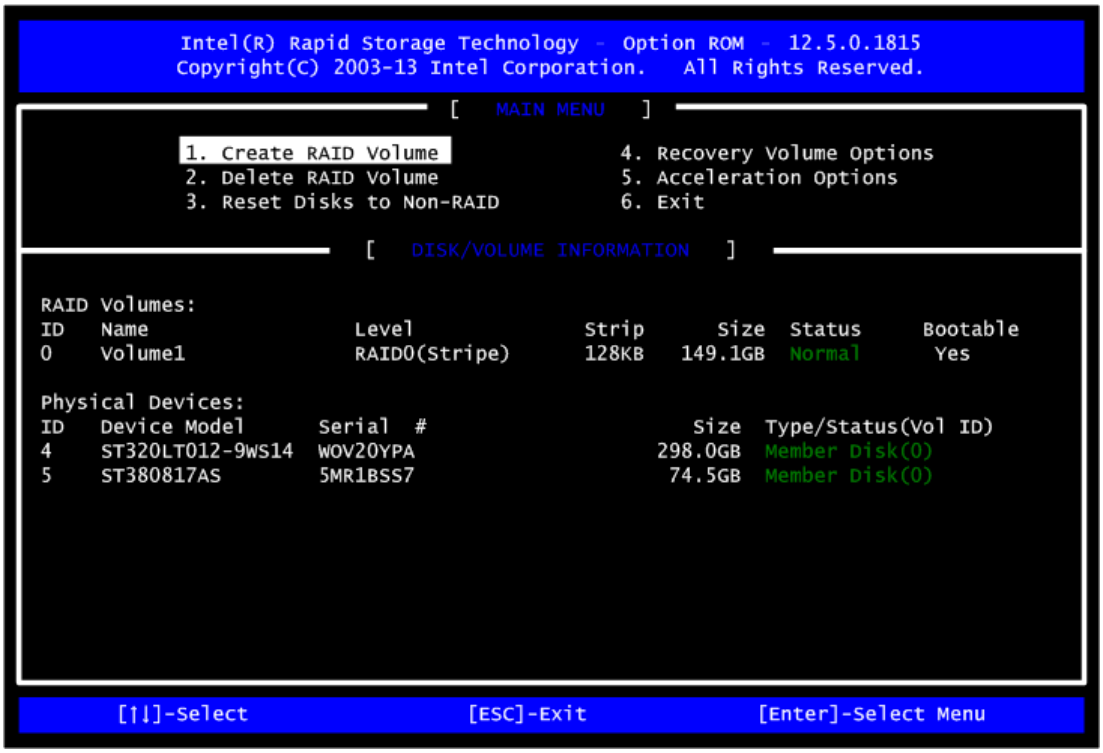
3.6. After setting all the items on the menu, select Create Volume and press <Enter> to start creating the RAID array.



3.7. When prompting the confirmation, press <Y> to create this volume, or <N> to cancel the creation.

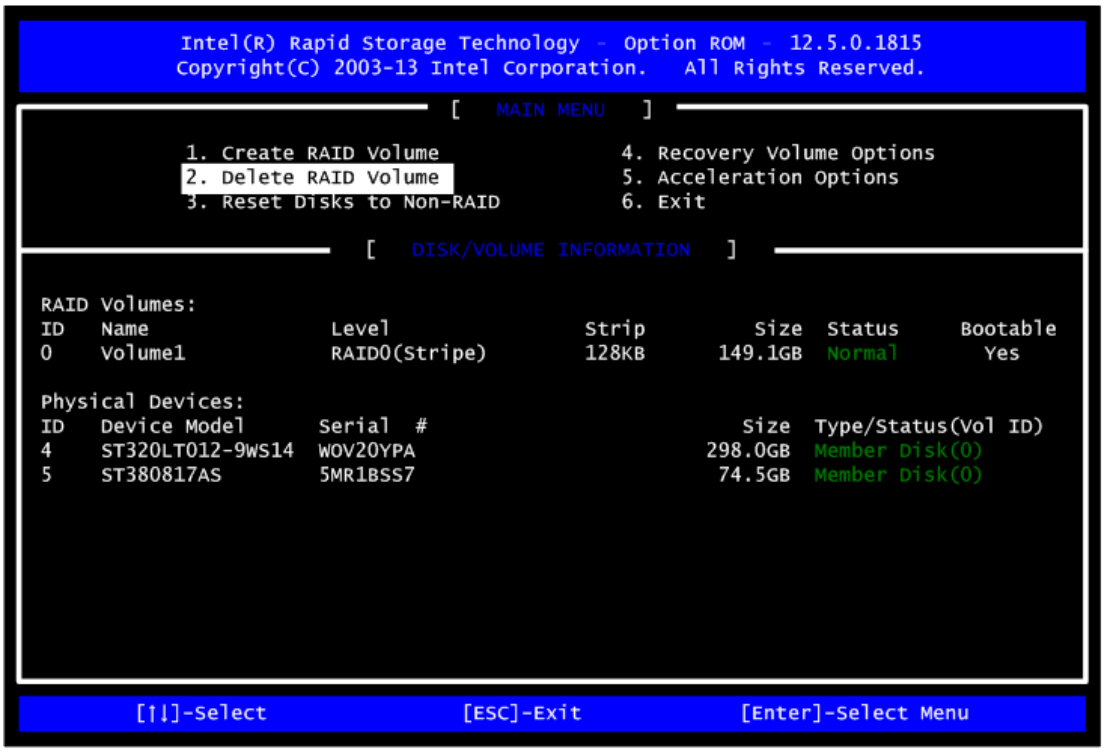


After the creation is completed, you can see detailed information about the RAID Array in the Disk/Volume Information section, including RAID mode, disk block size, disk name, and disk capacity, etc.



Delete RAID volume

If you want to delete a RAID volume, select the Delete RAID Volume option in Main Menu. Press <Enter> and follow on-screen instructions.



Please press <Esc> to exit the RAID BIOS utility. Now, you can proceed to install a SATA driver controller and the operating system.

Appendix D
iAMT Settings

The Intel® Active Management Technology (Intel® iAMT) has decreased a major barrier to IT efficiency that uses built-in platform capabilities and popular third-party management and security applications to allow IT a better discovering, healing, and protection their networked computing assets.

In order to utilize Intel® iAMT you must enter the ME BIOS (<Ctrl + P> during system startup), change the ME BIOS password, and then select "Intel® iAMT" as the manageability feature.

Entering MEBx

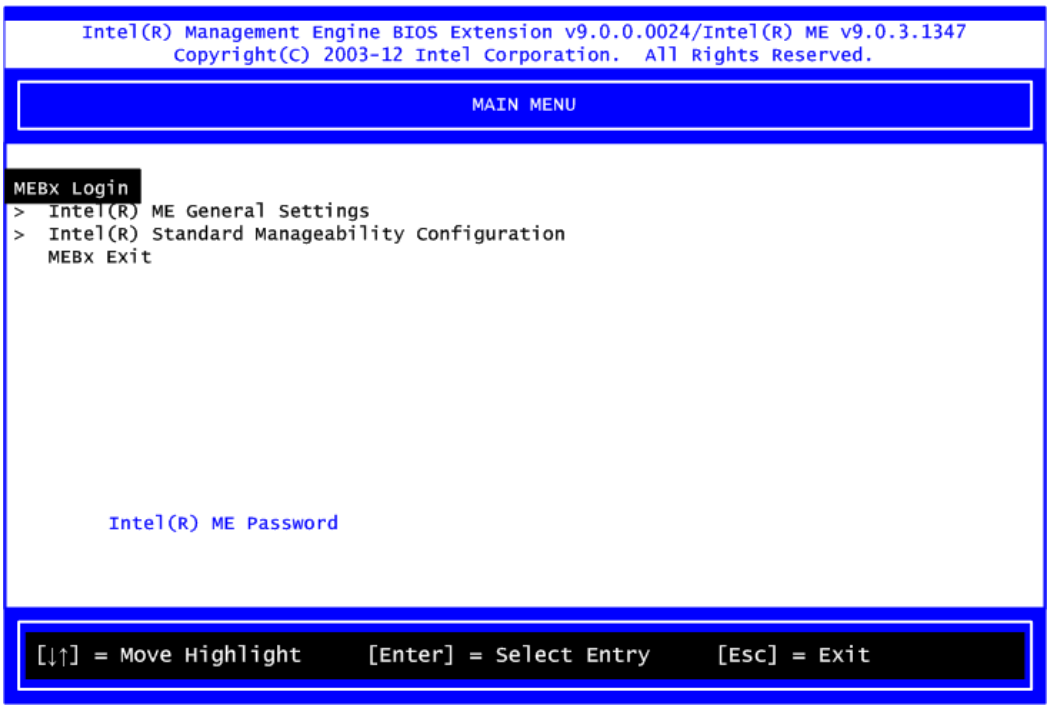
1. You must go to BIOS to enable iAMT function.
2. Exit from BIOS after starting iAMT, and press <Ctrl + P> to enter MEBx Setting.

Note

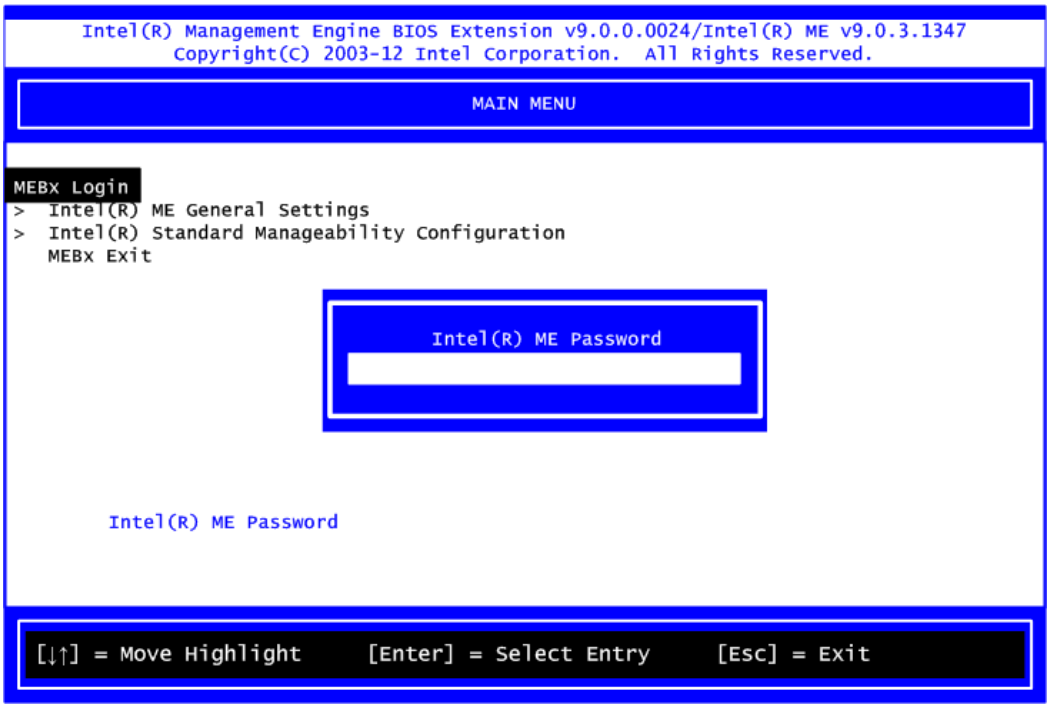
It is better to press <Ctrl + P> before the screen popping out.

Set and Change Password

1. You will be asked to set a password when first log in. The default password is "admin".



2. You will be asked to change the password before setting ME.



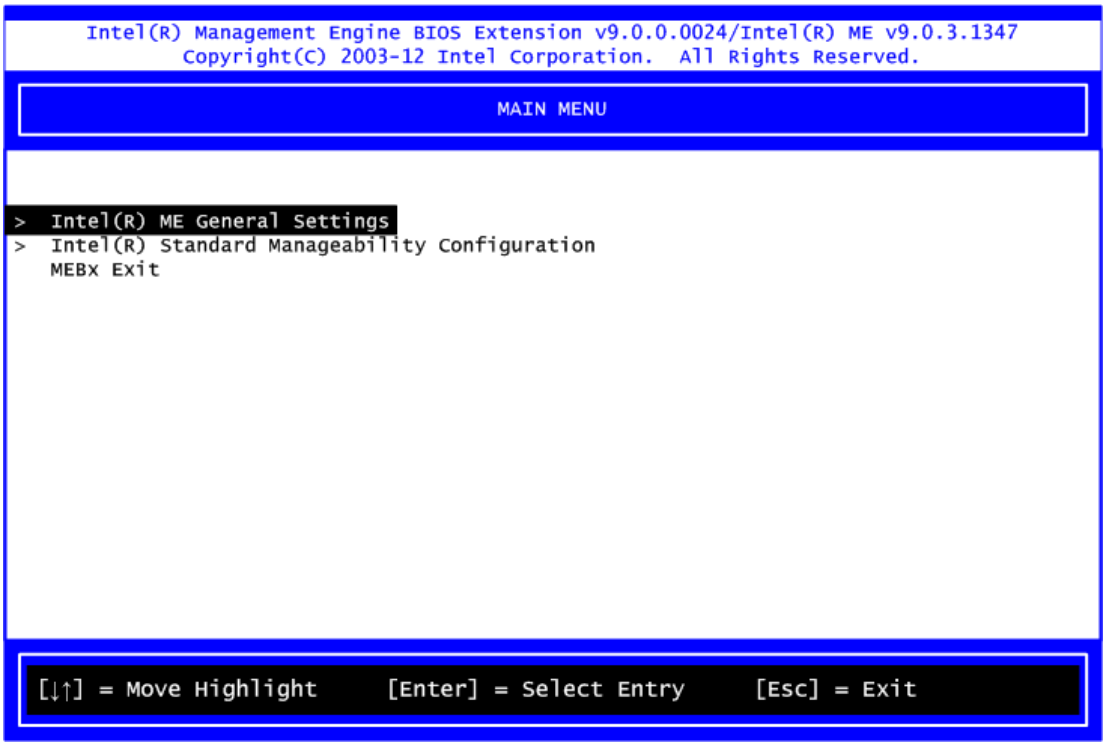
3. You must confirm your new password while revising. The new password must contain: (example: **!!11qqQQ**) (default value).

   - Eight characters
   - One upper case
   - One lower case
   - One number
   - One special symbol, such as ! 、 $ or ; ，(、 " , excepted)

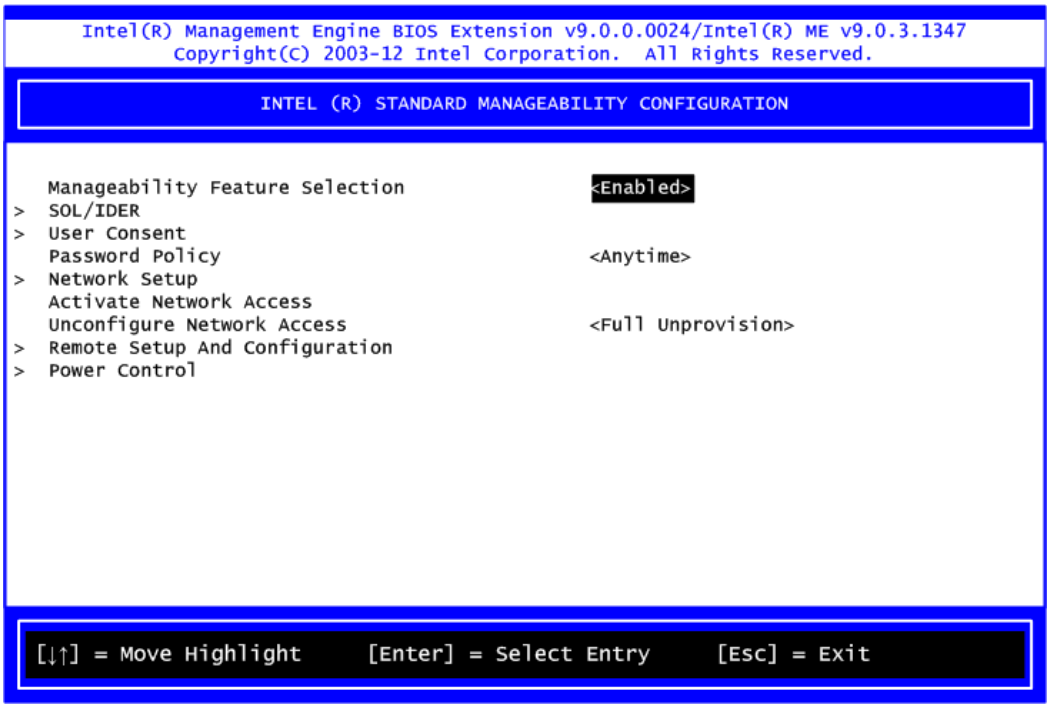
   Underline (_) and space are valid characters for password, but they won't make higher complexity.

iAMT Settings

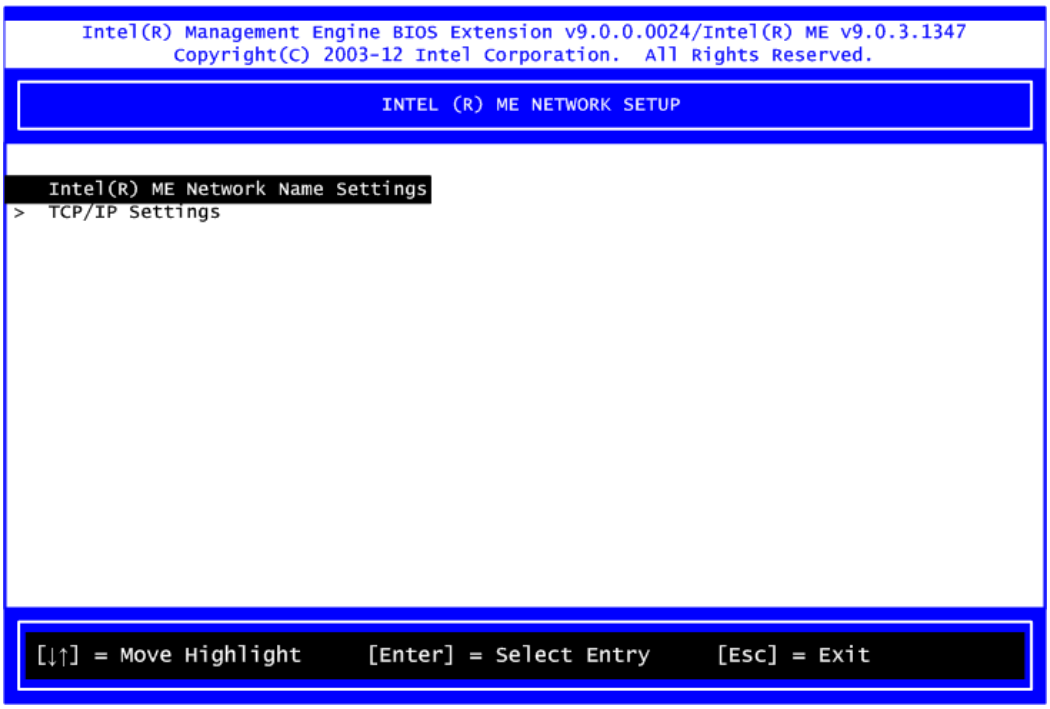
Select Intel® iAMT configuration and press <Enter>.

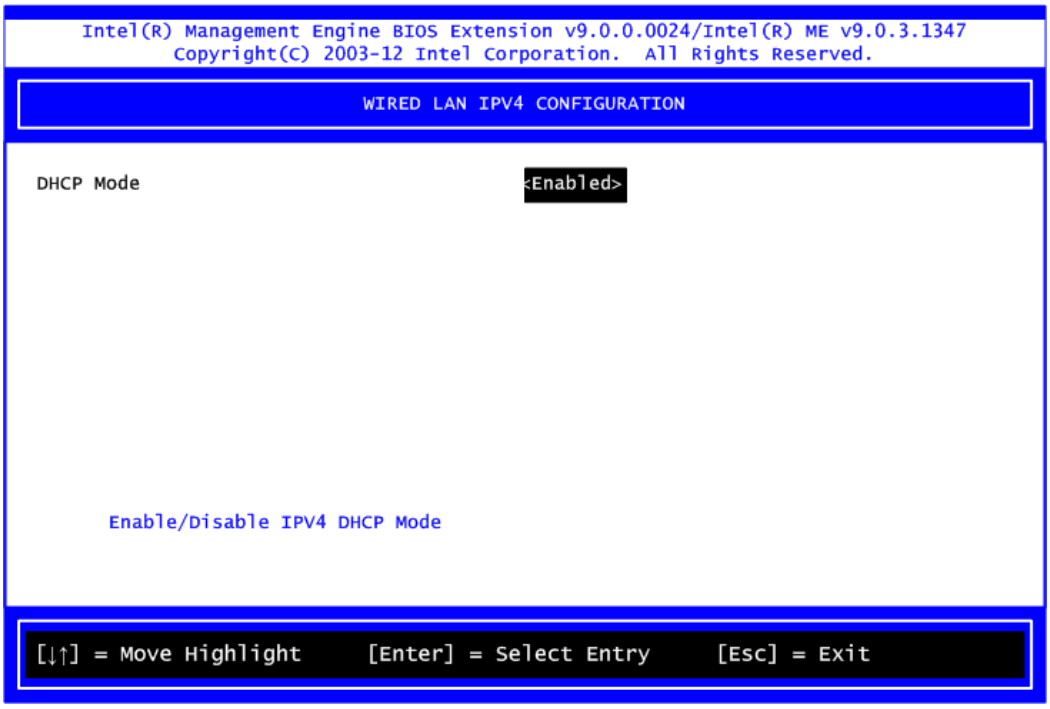


1. Select Network Setup to configure iAMT.



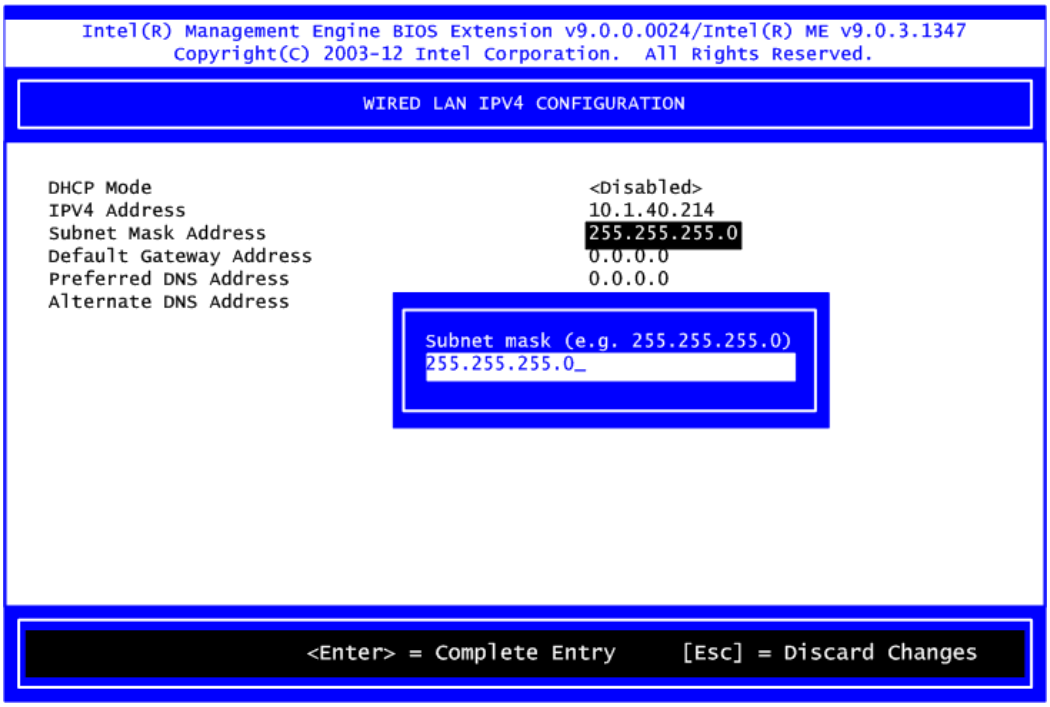
2. Select TCP/IP to get into Network interface and set it to Enabled. Get into DHCP Mode and set it to Disabled.



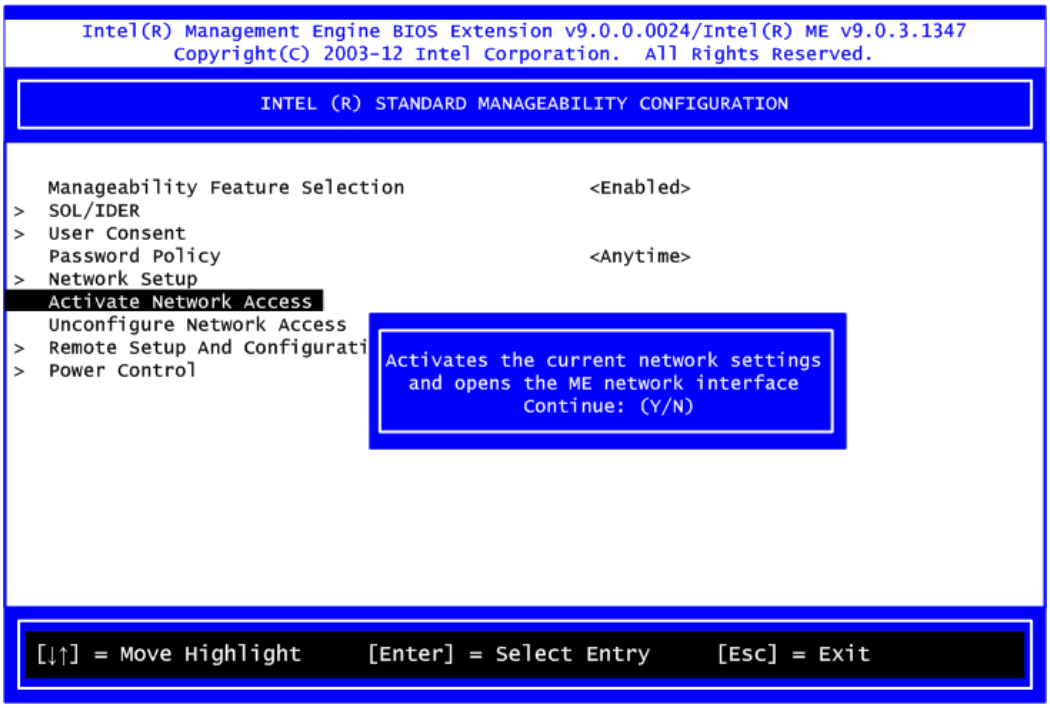


3. If DHCP Mode is disabled, set the following settings:

   - IP address
   - Subnet mask



4. Go back to Intel® iAMT Configuration, then select Activate Network Access and press <Enter>.

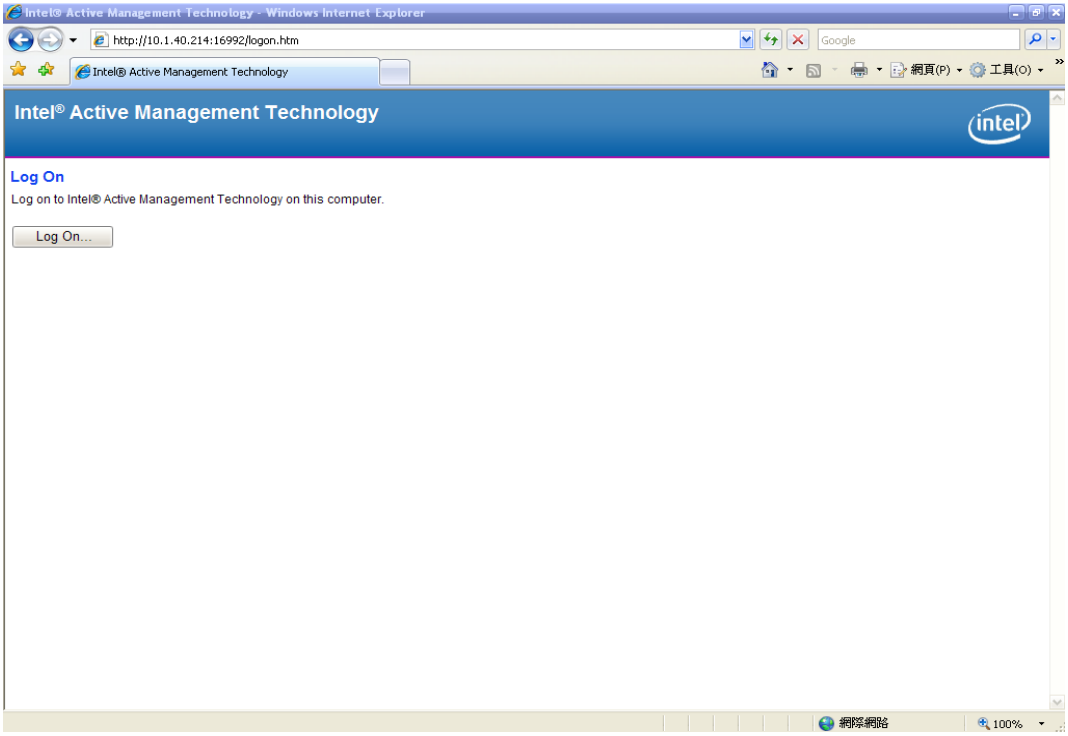


5. Exit from MEBx after completing the iAMT settings.

iAMT Web Console

1. From a web browser, please type http:///(IP ADDRESS):16992, which connects to iAMT Web.

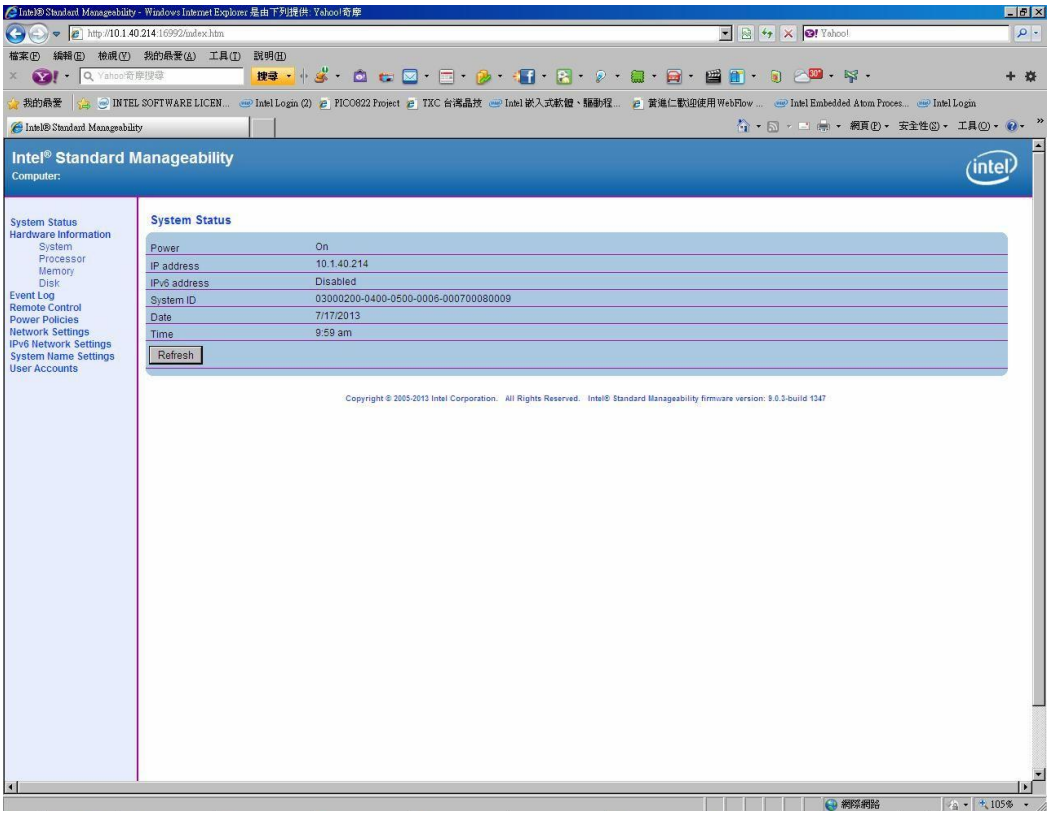
   Example: http://10.1.40.214:16992



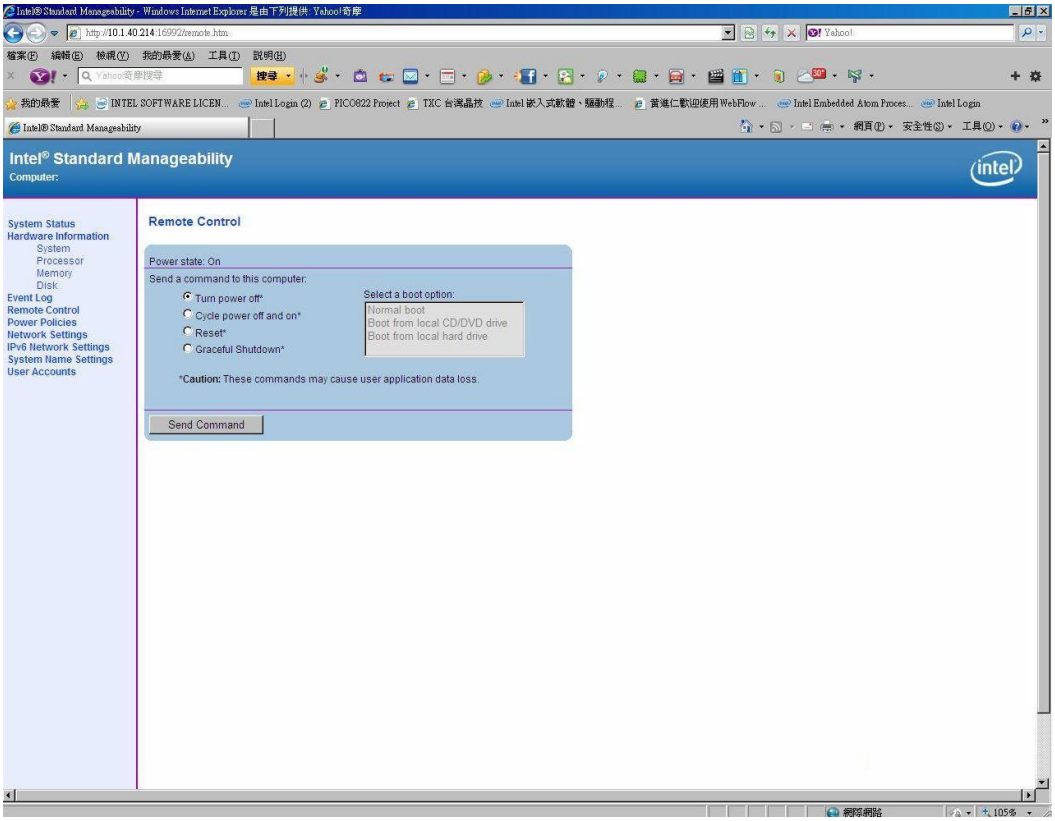
2. To log on, you will be required to type in username and password for access to the Web.

   USER: admin (default value)
   PASS: (MEBx password)

3. Enter the iAMT Web.



4. Click Remote Control, and select commands on the right side.



5. When you have finished using the iAMT Web console, close the Web browser.